FLIGHT

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

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CONTENTS.

With regard to photographs and descriptions of new British machines and those of our Allies, and other information which may be of help to our enemies, it should be noted that the Editor of FLIGHT, *in the National interest, submits all matter of this character to the Official Press Censor before publication. Hence our readers will appreciate that many new departures in construction or advances in detail work are necessarily held back for the present rather than the smallest risk should be run of helping those who are so strenuously fighting the Allies for the enforcement of their "Kultured" militarism.*—ED.

EDITORIAL COMMENT.

The Victims of German Rage.

With such a record for really high-class "Kultur" which the present war has in the past enabled the Germans to establish, it would be impossible to imagine anything too vile or savage by which they would not be willing to further besmirch their name for future generations to marvel at. That their latest abominations in the form of poisonous gases directed against their honourable foes should have been resorted to, is therefore hardly to be wondered at. Its momentary effect gave promise, not unnaturally, of bringing about a very serious setback for the Allies. But its powers for lasting evil were evidently considerably overrated, judging by the reaction which has followed the initial temporary success attained by the practise of such diabolical methods, whilst it has further stiffened the backs of the whole nation, if such were possible, in its determination to exact a *quid pro quo* when the time arrives. This was not the only episode of "frightfulness" of last week and it was only in keeping with the Huns' traditions that they should blatantly announce the shameful treatment which they had determined to inflict upon a selected number of their British prisoners by way of what they are pleased to term reprisals for the action of our Government in separating the captured crew of "U 8" from other German prisoners of war. And very rightly has this been done, is probably the verdict of most people who have followed in detail what these pirates of the sea have been guilty of. At the time of the Scarborough raids and the airship bomb-droppers' attack on unfortified places, we advocated the following of the Russian lead in treating the participants in these and similar iniquitous violations of the laws of humanity, as criminals rather than honourable foes fighting our forces. Let them, we maintained, when secured, justify their actions before a British Court of Justice, than which no fairer test of innocence or guilt could be devised. And so it came about later that the submarine pirate crew which had been relentlessly sinking vessels, crews, and passengers without warning, were duly put into safe keeping, apart from the other enemy prisoners, presently, it is to be hoped, to take their trial for murder on the high seas. But their treatment otherwise has not been different, we believe, to that meted out to the other prisoners of war. Therefore, if the Germans have no special accusation of crime of a similar character to bring against their prisoners of war, it is but another instance of their sheer brutality, embittered by the complete frustration of all their long-prepared plans, that they should throw into a felon's prison—and it is stated solitary confinement at that—a body of men, who are one and all the soul of honour, comprising such well-proved soldiers as, by way of example, Captain Robin Grey of the Royal Flying Corps. Rather should such men receive more considerate treatment. The selection of their victims has been cunningly made, so that the feelings of the Nation at home may be worked upon. But again the German savages have reckoned without their host. Without exception the attitude taken up in Parliament by all those who participated in last Tuesday's debate on the Prisoners in Germany, was highly dignified, and all ideas of reprisals on our part were scouted, as it was

realised that if it were a case of setting infamy up to remedy infamy, then the British idea of infamy would from the first be hopelessly beaten by the "made in Germany" article. But that due tribute is to be exacted in the days to come for all the shameful indignities inflicted on British soldiers is clear from the statement of the Prime Minister. Said Mr. Asquith:—

"I do not hesitate to say, and I say it in the plainest possible terms, that from the very beginning British prisoners have been treated by the Germans in a discriminating fashion. There can be no shadow of doubt about it. Those who have read the sworn testimony of our officers describing their treatment on the way from the places where they were captured either in France or Belgium to the different camps in which they were ultimately interned, and who have read the almost incredible tales of deliberate and calculated insult to which British officers and soldiers were exposed, and from which, to a considerable extent at any rate, their French and Belgian fellow-victims were shielded, must realise, that from the first it has been the deliberate policy of the Germans to expose our soldiers and officers to the worst possible treatment. That is a fact which is worth placing upon record when we come to consider whether or not adequate and proper steps have been taken by His Majesty's Government in the matter.

"We came to the conclusion, and I think we were right, that mere publicity and protest would be of no avail if the object was to secure better treatment. On the contrary, the Germans having adopted that as their deliberate policy, the more we protested, the more we published it to the world, the more they might be tempted to think they were attaining their end, I won't say to intimidate, but to exacerbate, as they wish, public opinion in this country. It is a horrible story, from whatever point of view you look at it. It is one of the blackest spots on the record even of German methods of warfare, and my main object in rising is to say this—I say it with all emphasis and with all deliberation—that when we come to the end of this war, which please God we may, we shall not forget, and we ought not to forget, this horrible record of calculated cruelty and crime, and we shall hold it to be our duty to exact such reparation against those who are proved to be the guilty agents and actors in the matter as it may be possible for us to do."

And it is well said. Let there be no maudlin sentiment or mistake over this when the day of reckoning comes. Let it be a lesson to the entire world. None is such a servile coward when really cornered as the bully. That the German higher command is but as one concrete bully, would appear to be the only conclusion to which it is possible to subscribe. Threaten his skin and his pocket individually, and it may start a train of thought which may enable him to conjure up visions of what his fate may be, when he no longer has as a background his subordinates to execute his inhuman commands, but stands before his Judges without hope of escape. For the crimes that have been perpetrated by the Germans full exaction should be enforced against those personally responsible for either the issuing of the orders or the permitting of their execution. There should be no distinction in regard to position. The punishment, which should fit the crime, should be inflicted on one and all who directly or indirectly were concerned in the atrocities, even if it involve the public execution of the highest commands in the land. Once it is realised that our "reprisals" will take this form at the finish, it may be that pause will be given to the present system of horrors in vogue.

If further justification were needed to push home this form of procedure, it is surely to be found in Lord Kitchener's scathing indictment of the German's iniquities. That he should have likened their methods to those of the Dervishes of the Soudan gives to them the atmosphere of the lowest depths of uncivilised barbarity. But here we are inclined to think that Lord Kitchener has done the Dervishes an injustice. We have read of the deeds of these gentle people from time to time, and on balance should say they would have to bury their heads in the sands of the desert in very shame at having been hitherto so slack and considerate in their ideas of viciousness.

That the Germans are particularly embittered against our flying officers we have every reason to believe, as their complete mastery over the German aeroplane pilots has from the first completely vitiated all their most carefully conceived plans of aggression. It is therefore with special satisfaction that we shall look forward to the bringing to justice those who may be proved responsible for the series of violations which have for ever disgraced the German nation.

Handicapping the German Airfleet.

In reviewing last week the possibilities of visits to this country by German dirigibles, we mentioned as one disturbing factor in the calculations of Count Zeppelin's staff, the little interferences which may arise from atmospheric conditions during their excursions. Now it is pleasing to announce that the Government has issued notice that as from Saturday next, May 1st, the weather forecasts from the Meteorological Office for the several districts of the British Isles will not be issued to the newspapers. The only forecasts issued will be in what is known as the harvest weather forecast service. These are entirely local in character, and are telegraphed to agriculturists upon payment of the cost of the telegrams.

This further curtailment of information regarding such a guiding factor as the elements, in all their capricious variations, must be a pretty hard knock to the responsible heads of the aircraft fleet which is waiting across the water for favourable winds to help them in their contemplated raids on Britain. At the opening of hostilities the usual weather chart issued to the Press was stopped. Later, in the winter weather reports, all references to movements of depressions and wind conditions were completely removed, a general idea as to the state of the sky, rain and temperature being only given out. Even this, we think, might have been usefully dispensed with, as there remained the possibility of the enemy being able to evolve some sort of chart out of this in combination with information obtainable from local centres. With the new order of things, however, it should be practically impossible for information to be collated in time to serve the Germans' ends. Our only complaint is that the step was not taken by our authorities long since.

The Roll of Honour.

THE following casualty in the Indian Expeditionary Force has been officially announced by the War Office:—

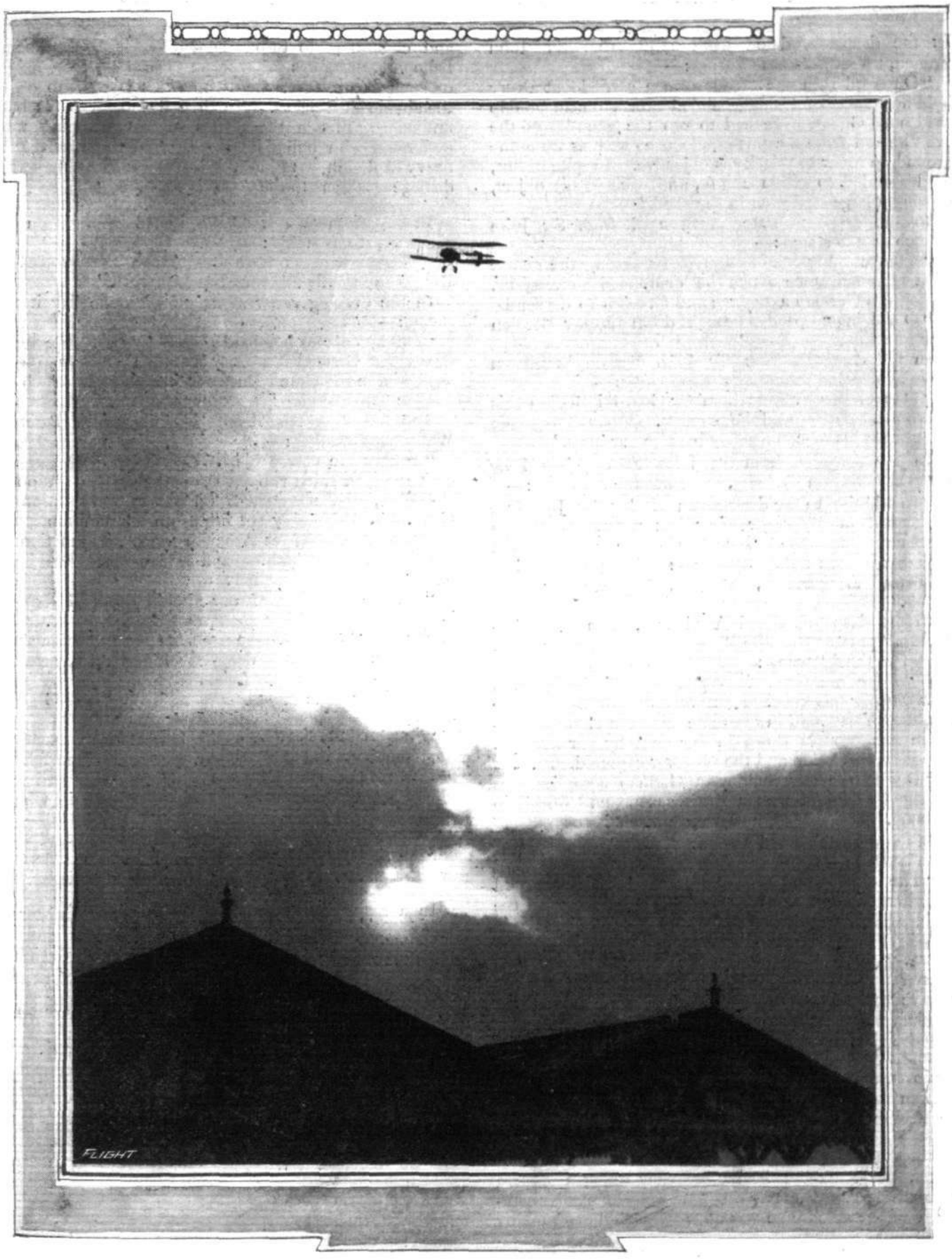
Died of Injuries received in an Aeroplane Accident.

Lieutenant B. L. Clarke, 23rd Cavalry, attached R.F.C.

According to an obituary notice in the *Morning Post* Second Lieutenant Frederick W. Polehampton was killed in action near Ypres on April 26th.

The German "Reprisals."

IT is interesting to record that the list, furnished by the American Ambassador, of the British officers in Germany who have been placed under arrest as a "reprisal" for the treatment of the crew of the German submarine "U.8" is headed by Capt. Robin Grey, of the Royal Flying Corps. It will be remembered that Capt. Grey was taken prisoner last November.



ANOTHER EVENING SCENE AT HENDON.—Mr. De Havilland on his De Havilland biplane.

AIRCRAFT WORK AT THE FRONT.

OFFICIAL INFORMATION.

IN the despatch, dated April 22nd, from Sir John French, there was the following:—

"On April 19th one of our airmen carried out a very bold and successful single-handed attack on an airship shed near Ghent. He had to run the gauntlet of the fire directed from a captive balloon as well as from the ground, in order to attack his objective. In spite of this, he descended to within 200 ft., and effected his object, causing a large explosion in the shed."

In the despatch, dated April 23rd, from Sir John French, it was stated:—

"This morning one of our aviators, during the course of a reconnaissance which he completed successfully, damaged a German aeroplane and forced it to descend.

"Our flying corps also brought down another German machine about Messines."

In the despatch from Sir John French issued on Monday evening there was the following:—

"One of our aviators bombed Courtrai Station this afternoon and destroyed the junction. Although wounded he brought his machine safely back to our lines."

In the despatch from Sir John French, issued by the War Office on Tuesday, there was the following:—

"In addition to the destruction of Courtrai Junction, mentioned in my *communique* last night, our airmen yesterday bombarded successfully the stations and junctions at the following places:—Tourcoing, Staden, Roubaix, Langemarck, Roulers, Ingelmunster, and Thielt."

In the despatch, dated April 20th, from an "Eye-witness" present with the British General Headquarters, there was the following:—

"On the next day, the 17th, one of the enemy's *Minenwerfer* was knocked out by our howitzers on the left, near Ypres, and in the same quarter a German aeroplane was brought down in our lines by our aviators. The pilot was killed and the observer captured. . . . .

"During the day, Sunday, a German aeroplane was damaged in a fight with a British plane, and forced to descend. It managed, however, to reach its own lines."

In the despatch dated April 23rd, from "Eye-witness," it was stated:—

"The chief event of interest which has occurred elsewhere on our front is the aerial raid made on the 19th, against the German airship shed near Ghent. As stated, it was carried out by an officer single-handed. Carrying three heavy bombs besides hand-grenades, he arrived near his objective about 5 p.m., and found that a captive balloon was anchored on guard. It was a calm evening, which enabled him to manœuvre, and as he was reconnoitring the position he threw one bomb at the airshed, clearly visible below, from a height of some 6,000 ft. Then, on discovering that he was being fired at from the car of the balloon as well as from the ground, he flew over the balloon, and, descending in a spiral directly above it, so that its occupants could not shoot at him, he threw his second bomb at it. This missed its target, but exploded below, probably doing a certain amount of damage, as by this time the whole neighbourhood of the aerodrome was alive with soldiers running about and shooting.

"Still planing down steeply as directly under the balloon as possible, so that its occupants could not conveniently shoot downwards, and the troops below could not shoot upwards, for fear of hitting their friends in the car, and continuing to throw hand-grenades at the enemy balloon until he was below it, he descended to a height of some 200 ft. before he dropped his last bomb on to the airship shed below. He then flew back to his base untouched, though the planes of his machine were perforated with bullet holes. Beyond the fact that a heavy explosion was caused, it is not possible to say what damage was done to the enemy's shed."

In the afternoon *communique* issued in Paris on the 21st inst., it was stated:—

"Belgian aviators have bombarded the arsenal at Bruges and the flying ground at Lissevegh."

In the evening *communique* on the same day it was stated:—

"Our aeroplanes bombarded in the Woevre the headquarters of General von Strantz and a number of convoys, and in the Grand Duchy of Baden at Loerrach an electric power station."

The following official note was issued in Paris on Wednesday evening:—

"During the course of the day of the 27th our aircraft dropped thirty-two shells on the railway station at Bollwiller, and sixty shells on the railway station at Chambley, where they set fire to an ammunition store. The railway station at Arnaville and the junction of the lines from Chambley and Thiaucourt were bombarded by night.

"On the 28th one of our aircraft dropped six projectiles on the dirigible sheds at Friedrichshafen. The pilot saw a cloud of smoke rise from the roof of a shed. Twenty-one shells were dropped on the railway station bridges and works at Leopoldshoehe. During this bombardment one of our aircraft fell in the German lines.

"In the course of the day four German machines were pursued and hit by our aviators. One fell in flames in the enemy's lines near Brimont, and two others came down near our trenches—one in Champagne and the other in the region of the Ancre—and were destroyed by our artillery. The fourth landed in our lines at Muizon (west of Rheims). The two German aviators, who were unwounded, were taken prisoners."

In a *communique* issued by the Belgian Minister of War on Saturday it was stated:—

"Notwithstanding the very strong wind our aviators have been able to do some useful reconnoitring."

In a *communique* issued in Petrograd on the 21st, there was the following:—

"A number of German aeroplanes appeared over Baelostok on April 20th, and dropped about 100 bombs, killing some of the civil population. No particular damage was done.

"On the night of April 20th the town of Ciechanov was bombarded by a Zeppelin, but the bombs dropped did no damage. We have successfully bombarded Soldau Station."

In a despatch from the Russian Commander-in-Chief, published in Petrograd on Sunday evening, it was stated:—

"Our Ilya Mourametz aircraft, on the morning of the 24th, made a successful attack on the station of Neidenburg, where their bombs caused a number of fires and destroyed part of the railway line."

In a semi-official statement issued in Petrograd on April 22nd there was the following :—

"In the direction of Lomja two enemy batteries suffered heavily, as also did their trains of artillery and ammunition wagons in the region of Staviska and a convoy on the Kolno road. Thanks to aeroplanes and the long range and rapid fire of our guns, we succeeded, frequently at a distance of twelve versts (eight miles), in inflicting grave losses on the enemy's reserves, which think they are in security. . . . . Near Zambroff we brought down a German aeroplane, the two aviators being made prisoners.

"Raids by German aviators, which have become more frequent, cause almost no damage among our troops, but, when their bombs fall in quarters of a town where there is a dense population, principally Jewish, as at Bielostok, then the raids cause much loss of life. Hitherto our aviators have confined themselves exclusively to the bombardment of military works and troops. However, in view of the Apachism of the enemy airmen towards the peaceful inhabitants of Gechanoff, Ostrolenko, Lomja, Bielostok, and other populated places they will be forced to begin reprisals."

In a despatch from the headquarters of the Russian Commander-in-Chief, issued in Petrograd on Monday night, it was stated :—

"At dawn yesterday a German Zeppelin threw several bombs on the town of Bielostok, but caused no losses."

In a despatch issued on the following evening there was the following :—

"Our Ilya-Murometz aircraft successfully dropped bombs on German aeroplanes at an aerodrome near the village of Sanniki. During the day we damaged and captured two German and Austrian aeroplanes."

In a semi-official statement regarding the bombardment of the Bosphorus forts, issued in Petrograd on April 25th :—

"Observations made by hydroplanes showed the accuracy of the fire of the squadron. The enemy's batteries attempted to shell our aviators, but without success."

In a telegram sent out from the Serbian Press Bureau at Nish on Saturday regarding some operations north of Semlin it was stated :—

"The enemy opened fire from his guns of position towards Belgrade against our aeroplanes, which were engaged in reconnaissance work, but his efforts were without result."

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THE BRITISH AIR SERVICES.

UNDER this heading are published each week the official announcements of appointments and promotions affecting the Royal Naval Air Service and the Royal Flying Corps (Military Wing) and Central Flying School. These notices are not duplicated. By way of instance, when an appointment to the Royal Naval Air Service is announced by the Admiralty it is published forthwith, but subsequently, when it appears in the LONDON GAZETTE, *it is not repeated in this column.*

Royal Naval Air Service.

THE following announcement was made by the Admiralty on the 22nd inst. :—

Temporary commissions have been granted as follows : H. Dobell, as Lieutenant-Commander (R.N.V.R.), and E. C. Hugh, as Lieutenant (R.N.V.R.), both with seniority of April 21st, and appointed to "President," for R.N.A.S.

The following announcement was made by the Admiralty on the 23rd inst. :—

Probationary Flight Sub-Lieuts. E. F. Moyes and S. E. Ritchie confirmed in the rank of Flight Sub-Lieutenant.

F. P. Gardener, granted temporary commission as Lieutenant (R.N.V.R.), with seniority of April 22nd, and appointed to "President," additional, for Inspectional Duties in R.N.A.S.

Acting Carpenter S. C. Tucker, to "President," additional, for R.N.A.S. (appointment to the "Pembroke," supernumerary, cancelled). April 1st.

The following announcement was made by the Admiralty on the 24th inst. :—

Lieut. A. W. Glemson, R.N.R., transferred to Royal Naval Air Service as Acting Flight-Lieutenant, and appointed to "President," additional, for R.N.A.S. ; April 23rd. L. T. Pennington entered as Probationary Flight Sub-Lieutenant, and appointed to "President," additional, for R.N.A.S. ; April 15th.

The following announcement was made by the Admiralty on the 25th inst. :—

Flight-Commander E. T. R. Chambers, granted the acting rank of Squadron-Commander, with seniority of April 17th. Flight-Commander the Hon. C. M. P. Brabazon (Military Wing, Royal Flying Corps), transferred to Royal Naval Air Service, as Squadron-Commander, with seniority of April 19th, and appointed to "President," additional, for R.N.A.S.

Surgeon (R.N.V.R.)—T. Turner, to "President," additional, for the Armoured Car Division. April 25th.

Temporary commissions have been granted, with seniority as follows :

Lieutenants (R.N.V.R.)—A. H. Binyon ; April 19th. J. E. A. Greatorex and S. Flower ; April 22nd. L. C. Hope ; April 24th. All to "President," additional, for R.N.A.S. J. E. Temple and O. G. C. Drury, April 25th, and both appointed to "President," additional, for Inspectional Duties with R.N.A.S.

Sub-Lieutenants (R.N.V.R.)—C. L. Robinson and G. Hindle ; April 19th. C. H. D. Smith ; April 24th. J. F. Howson and W. C. C. Sykes ; April 25th. And all appointed to "President," additional, for R.N.A.S.

The following announcement was made by the Admiralty on the 27th inst. :—

Probationary Flight Sub-Lieutenants—J. O. Grodes, R. D. G. Sibley, E. Parker, F. T. Digby, B. D. Kilner, R. C. Petter, R. S. Sorley, and C. W. F. Morgan, all confirmed in the rank of Flight Sub-Lieutenant, with original seniority, and re-appointed. To date April 24th.

Probationary Flight Sub-Lieutenants (for temporary service)—R. Lord, J. D. Newberry, J. T. Bankes-Price, and R. H. Mulock, all confirmed in the rank of Flight Sub-Lieutenant, for temporary service, with original seniority, and re-appointed. To date April 24th.

Temporary commissions have been granted as follows : Capt. G. Errington (4th North Staffordshire Regt.) and C. B. Fairer-Smith, as Lieutenants (R.N.V.R.), with seniority of April 20th and 26th respectively, and both appointed to "President," additional, for duty with R.N.A.S. (armoured cars) ; E. A. B. Belt, A. J. Dreydel, W. P. Donne, J. L. Allport, as Sub-Lieutenants (R.N.V.R.), with seniority of April 26th, and all appointed to "President," additional, for duty with R.N.A.S. (armoured cars).

Chief Petty Officer (R.N.V.R.)—A. T. Miller, promoted to temporary Sub-Lieutenant, with seniority of April 25th, and appointed to "President," additional, for duty with R.N.A.S. (armoured cars).

Royal Flying Corps (Military Wing).

THE following appeared in a supplement to the *London Gazette* issued on the 22nd inst. :—

Assistant Equipment Officer.—Second Lieut. H. T. Musker, Special Reserve. March 11th, 1915.

The following appeared in the *London Gazette* of the 23rd inst. :—

Supplementary to Regular Corps.—Second Lieut. the Hon. Edward A. Stonor to be Lieutenant. March 16th, 1915.

Memoranda.—Lieut. the Hon. Edward A. Stonor, Royal Flying Corps, Special Reserve, to be temporary Captain. April 9th, 1915.

The following appeared in a supplement to the *London Gazette* issued on the 24th inst. :—

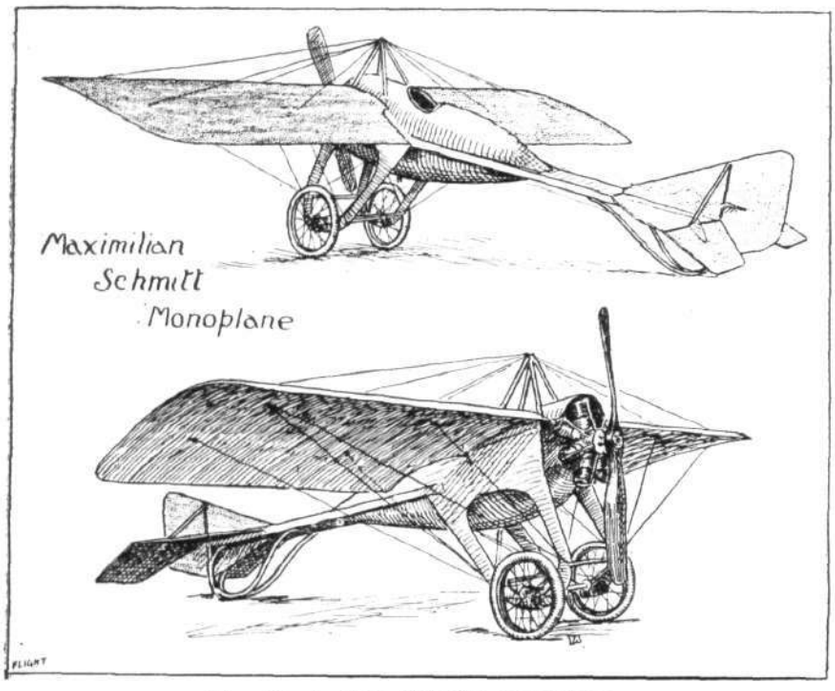
Supplementary to Regular Corps.—Second Lieutenants (on probation) confirmed in their rank : Arthur M. Cott, Alexander Graham Clark, Thomas E. Robertson, John W. Griffith, Charles P. Ogden. Lord Hugh R. H. Gascoigne-Cecil to be Second Lieutenant (on probation) ; April 5th, 1515.

The following appeared in a supplement to the *London Gazette* issued on the 25th inst. :—

Flying Officers.—March 26th, 1915 : Lieut. Edgar J. Bannatyne, 19th (Queen Alexandra's Own Royal) Hussars, and to be seconded. Second Lieut. Ernest E. Hodgson, Special Reserve. Second Lieut. Selden H. Long, Durham Light Infantry, and to be seconded.

THE MAXIMILIAN SCHMITT MONOPLANE.

IN the United States the monoplane has not been developed to anything like the same extent as the biplane. Indeed, what few monoplanes that have been manufactured have been mostly of the Blériot type, and originality has only shown itself in one or two cases. One of these is to be found in the Maximilian Schmitt monoplane, which made its first appearance at Paterson, N.J., last summer, when F. C. Hild did much successful flying on it. As will be seen from the accompanying sketches, the construction of the body of this machine is unusual. The forward portion of it consists of a *coque* of true streamline form, circular in section, tapering at the rear into an after portion rectangular in section and very flat and narrow, which carries the tail planes. Thus the forward portion is of ample proportions for housing the pilot, fuel tanks, and engine. The latter, which is a 50 h.p. Gnome, is mounted in the nose with a metal cowl over the top that deflects the greater part of the exhaust and oil away from the pilot's cockpit. The landing chassis is similar in appearance to that fitted on the British-built Deperdussin monoplane, consisting of two U members built into the body. In the Deperdussin these members were of multi-ply wood, whereas those of the Schmitt are, we believe, of steel.



The Maximilian Schmitt monoplane.

The tubular axle carrying a pair of running wheels is attached to the lower ends of the U members by rubber bands, whilst radius rods hold the axle in correct alignment. Two cane skids attached to the body underneath the tail planes keep the latter clear from the ground. The main planes are built up on two main spars in the usual monoplane style in two units, being attached to the body high up. The rear spar is situated some distance from the trailing edge, so that a very effective warp is provided. A portion of the plane behind the rear spar on either side of and close to the body is cut away in order to provide an uninterrupted view below for the pilot. The wings are cable-braced top and bottom, in the former case from a pyramid of four steel tubes mounted on the body just in front of the pilot's cockpit, and in the latter case from the U members of the landing chassis. The tail planes consist of a triangular stabilising plane, to the trailing edge of which are hinged two elevator flaps and two triangular vertical fins above and below the stabilising plane, with a vertical rudder hinged to the rear edge. The principal dimensions of the Maximilian Schmitt monoplane are: Span, 25 ft.; chord, 6 ft.; supporting area, 150 sq. ft.; overall length, 18 ft.; weight in flying trim, 600 lbs.; speed, 65 m.p.h.; climbing speed, 50 ft. per min.

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Parliament and the R.F.C.

IN his speech on the Army Estimates in the House of Commons on Thursday of last week, Mr. Tennant, the Under Secretary for War, made the following reference to the R.F.C. and its work:—

"Everything was going well with the Flying Corps. Very large additions had been made to its effective strength since the beginning of the war, in spite of the difficulties of training new men in this most difficult arm of the Service and of manufacturing material, and it was hoped that when new formations of the new Army took the field they would be sufficiently provided with aeroplanes. Considerable strides had been made towards making the country self-supporting; and during the severe fighting which took place in March the Royal Flying Corps more than justified the reputation which he claimed for it on February 8th."

Malaya Presents Aeroplanes.

ACCORDING to information received from Penang, 15 aeroplanes are being presented to the British Army Council by the Federated Malay States, the cost being defrayed by voluntary subscriptions. The response to the appeal for funds has been enthusiastic, and all races and classes are co-operating in this most popular movement. It is stated, for instance, that in the Chinese mining village of Kinta, one collector in a few days received promises of various sums of money totalling £2,000.

Fabric for Aeroplanes.

THE following statement regarding the manufacture of fabric for aeroplane surfaces appeared in the *Times* of the 24th inst.:—

"The Admiralty have recently taken steps, through the agency of an expert, to organise the production in Lancashire of the cotton fabric used for the 'wings' of aeroplanes. The fabric needed for this purpose must combine lightness with strength, and the greatest care must be taken to detect flaws, which might cost an airman his life. It is made from a yarn so fine and of such high quality that not more than half a dozen spinners can produce it; and it is believed that its production is confined to Lancashire. We are informed on good authority that at least one large consignment for export which, it was thought, might have been destined ultimately for the enemy has been stopped within the last few weeks. Those who are urging the Government to declare cotton absolute contraband point to this as another illustration of the importance of cotton to a belligerent."

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

SPECIAL COMMITTEE MEETING.

A Special Meeting of The Committee was held on Tuesday, the 27th inst., when there were present: Prof. A. K. Huntington, in the Chair, Mr. Ernest C. Bucknall, Mr. C. F. Pollock, and the Assistant Secretary.

Election of Member.—The following New Member was elected:—

James Bird.

Aviators' Certificates.—The granting of the following aviators' certificates was confirmed:—

1164 2nd Lieut. Alan Murray Waistell (4th Royal Warwickshire Regt.) (Maurice Farman Biplane, Military School, Farnborough). March 24th, 1915.

1165 Flight Sub-Lieut. Colin Johnson, R.N.A.S. (Bristol Biplane, Royal Naval Air Station, Eastbourne). April 11th, 1915.

1166 Flight Sub-Lieut. Cyril Tollemache, R.N.A.S. (Bristol Biplane, Royal Naval Air Station, Eastbourne). April 11th, 1915.

1167 Flight Sub-Lieut. Arthur Charles Teesdale, R.N.A.S. (Short Biplane, Royal Naval Flying School, Eastchurch). April 12th, 1915.

1168 Flight Sub-Lieut. William Henry Wood, R.N.A.S. (Short Biplane, Royal Naval Flying School, Eastchurch). April 12th, 1915.

1169 Commander Frederick Crosby Halahan, R.N. (Maurice Farman Biplane, Royal Naval Air Station, Hendon). April 12th, 1915.

1170 Flight Sub-Lieut. Benjamin Travers, R.N.A.S. (Bristol Biplane, Royal Naval Air Station, Hendon). April 12th, 1915.

1171 Kelham Kirk Horn (Maurice Farman Biplane, Military School, Brooklands). April 15th, 1915.

1172 Flight Sub-Lieut. Francis Joseph Edward Feeny, R.N.A.S. (Grahame-White Biplane, Grahame-White School, Hendon). April 15th, 1915.

1173 1st Class Air Mechanic George Leslie Haydon, R.F.C. (Caudron Biplane, Ruffy-Baumann School, Hendon). April 15th, 1915.

1174 Flight Sub-Lieut. George Turner Cain, R.N.A.S. (Bristol Biplane, Royal Naval Air Station, Eastbourne). April 15th, 1915.

1175 2nd Lieut. John Charles Quinnell, R.H. and R.F.A. (Maurice Farman Biplane, Military School, Shoreham). March 23rd, 1915.

1176 Lord Hugh Cecil (Maurice Farman Biplane, Military School, Shoreham). April 10th, 1915.

1177 Lieut. Wayland Joyce (Bedfordshire Regt.) (Maurice Farman Biplane, Royal Flying Corps, South Harrow). April 12th, 1915.

1178 2nd Lieut. David Samuel Jillings (Maurice Farman Biplane, Military School, Shoreham). April 15th, 1915.

1179 Darrell Brodie James (Maurice Farman Biplane, Military School, Brooklands). April 19th, 1915.

1180 Flight Sub-Lieut. Thomas Francis Nettenville Gerrard, R.N.A.S. (Bristol Biplane, Royal Naval Air Station, Hendon). April 11th, 1915.

1181 2nd Lieut. the Hon. Oscar Montague Guest (Lothians and Border Horse) (Maurice Farman Biplane, Central Flying School, Upavon). April 14th, 1915.

1182 Lieut. Reginald Arthur Saunders, R.F.A. (Maurice Farman Biplane, Military School, Shoreham). April 16th, 1915.

1183 2nd Lieut. Percival George Arthur Harvey (Maurice Farman Biplane, Military School, Shoreham). April 19th, 1915.

1184 John Percy Claude Sewell (Maurice Farman Biplane, Military School, Brooklands). April 21st, 1915.

1185 Charles Cleaver Miles (Maurice Farman Biplane, Military School, Brooklands). April 21st, 1915.

1186 Flight Sub-Lieut. Reginald Marsh Everett, R.N.A.S. (Bristol Biplane, Royal Naval Air Station, Eastbourne). April 21st, 1915.

1187 Lieut. Douglas Maitland King (18th Hussars) (Reserve of Officers) (Maurice Farman Biplane, Military School, Brooklands). April 22nd, 1915.

1188 Flight Sub-Lieut. John Forgan Potts, R.N.A.S. (Grahame-White Biplane, Grahame-White School, Hendon). April 22nd, 1915.

1189 Frederick Hugh Lincoln (L. and P. Biplane, London and Provincial School, Hendon). April 22nd, 1915.

1190 Robert Gordon Gould (L. and P. Biplane, London and Provincial School, Hendon). April 24th, 1915.

1191 2nd Lieut. Charles d'Arcy Edmund Wentworth Reeve (Suffolk Regt.) (Maurice Farman Biplane, Military School, Farnborough). April 24th, 1915.

The following Aviators' Certificates were granted:—

1192 Flight Sub-Lieut. Charles Vernon Arnold, R.N.A.S. (Short Biplane, Royal Naval Flying School, Eastchurch). April 19th, 1915.

1193 Flight Sub-Lieut. Grahame George Dawson, R.N.A.S. (Short Biplane, Royal Naval Flying School, Eastchurch). April 19th, 1915.

1194 Flight Sub-Lieut. Royce Gustave Andre Baudry, R.N.A.S. (Short Biplane, Royal Naval Flying School, Eastchurch). April 19th, 1915.

THE FLYING SERVICES FUND.

Administered by The Royal Aero Club.

The Lords Commissioners of the Admiralty and the Army Council having signified their approval, the Royal Aero Club has instituted and will administer a fund originated by M. André Michelin for the benefit of officers and men of the Royal Naval Air Service and the Royal Flying Corps who are incapacitated on active service, and for the widows and dependents of those who are killed.

The fund is intended for the benefit of all ranks, but especially for petty officers, non-commissioned officers and men.

In view of the great utility of the work of the Flying Services, evidence of which has been repeatedly given in the official despatches of the Commander-in-Chief, the skilful and daring flights into enemy country, and the protection afforded by the continuous patrolling of our coast by aircraft, it is confidently expected that the British public will welcome this opportunity of showing their appreciation by subscribing promptly and liberally to the fund.

The Right Hon. Lord Kinnaird has kindly consented to act as Honorary Treasurer to the Fund.

Subscriptions should be forwarded to The Flying Services Fund, The Royal Aero Club, 166, Piccadilly, London, W., or to Barclay and Co., Ltd., 1, Pall Mall East, London, S.W. Cheques should be crossed "Barclay and Co., Ltd."

Tullibardine, Brig.-General,
Chairman of the Royal Aero Club.

	£	s.	d.
Total subscriptions received to April 21st, 1915... ...	8,488	13	11
Lieut. C. S. Leaf ...	1	1	0
Earl of Lonsdale ...	10	0	0
Mrs. and Miss Brooker	0	10	6
W. H. Brooker ...	0	10	6
T. F. Woodfine ...	1	0	0
Employés of the Royal Aircraft Factory, South Farnborough	29	8	8
F. E. E.	2	2	0
Cellon Limited ...	10	10	0
Collected by Miss Lillie Wood	1	0	6
Capt. Ronald Burns ...	1	1	0
Mrs. C. Castell ...	1	1	0
The Anglo-American Oil Co., Ltd. ...	50	0	0
Lady Lennard ...	2	0	0
Collected by Miss J. M. Ogilvie	0	3	0
Eric L. G. Dower ...	0	10	6
Total, April 28th, 1915 ...	8,599	12	7

166, Piccadilly, W. B. STEVENSON, Assistant Secretary.

FROM THE BRITISH FLYING GROUNDS.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Monday, last week, Probationary Flight Sub-Lieut. Bone half circuits.

Tuesday, Probationary Flight Sub-Lieut. De Ville straights with instructor. Probationary Flight Sub-Lieuts. Bone and Kerby circuits.

Wednesday, Probationary Flight Sub-Lieuts. Bingham, Coleman, De Ville, Hutchinson and Simpson straights with instructor.

Thursday, Probationary Flight Sub-Lieuts. Bone and Kerby circuits. Probationary Flight Sub-Lieuts. Bingham and Coleman straights with instructor.

Friday, Probationary Flight Sub-Lieut. Bingham straights with instructor. Saturday, Probationary Flight Sub-Lieuts. Bingham and De Ville straights with instructor.

On Wednesday, Probationary Flight Sub-Lieut. Potts passed *brevet* tests, taking very good ticket.

Instructors during the week: Messrs. Manton, Russell and Winter.

Beatty School.—The following pupils were out during last week, accompanied by the instructor:—Messrs. Allcock (25 mins.), Bright (40), Chapelle (15), Cooper (41), Crowe (6), De Meza (20), Faning (15), Fraser (30), Leong (50), Monfea (5), Roche (45), Whincup (5), Wiles (5), Fitz-Herbert (5), Crossman (5), Johnston (10), Rutherford (5), Ross (5), Hay (15), Summers (15). The instructors were Messrs. G. W. Beatty, W. Roche-Kelly, and C. B. Prodger, the machines in use being Beatty-Wright dual control and single-seater.

Exhibition flights were given on the 22nd and 24th, and 4 passenger flights were taken.

Hall School.—Monday, last week, Messrs. Cook, Hill, Minot six straights each, Lieut. Blyth eight flights at 45 ft.

Tuesday, very windy.

Wednesday, in evening, Messrs. Cook, Hill, Minot, Mitchell four straights each.

Thursday, at 6 a.m., Messrs. Minot, Cook, Hill, Hatchman, Mason, Mitchell, Cini four straights each; Mr. Stevens ten straight flights at 30 ft., four half-circuits, and two excellent circuits at 100 ft.; Mr. Stevens five circuits at 800 ft. on No. 2 *brevet* tractor. In evening, Messrs. Mason and Snowdon on No. 2 biplane with Mr. Hall, and Messrs. Cook, Mason, Snowdon, Hill, Minot, Mitchell four straights each.

Friday, Messrs. Cook, Mason, Snowdon, Mitchell two straights each; Mr. Hill two good straight flights.

Saturday, Messrs. Mason, Minot, Mitchell and Lieut. Barker doing good straights, and Mr. Stevens two circuits on tractor No. 1.

Instructors of the week: Messrs. J. L. Hall, J. Moore. Machines in use: Nos. 1, 2, 3 Hall tractor biplanes.

1st Class Air-Mechanic G. Leslie Haydon, R.F.C., who took his Royal Aero Club certificate this month at the Ruffy-Baumann School of Flying, Hendon.

London and Provincial Aviation Co.—Instructors for last week: W. T. Warren and M. G. Smiles.

On Monday, Mr. Lincoln circuits; Messrs. Gould, Crooke, Smiles and Gerrit Forbes straights.

Tuesday, Messrs. J. A. H. Crooke and W. D. Smiles straights; Messrs. Gould and Forbes half-circuits.

Wednesday, Mr. Lincoln circuits and eights, then flew for certificate, which he obtained in excellent style; Mr. Gould half-circuits.

Thursday, Mr. Smiles straights; Mr. Crooke half-circuits; Mr. Tranchomme rolling; Messrs. Gould and Gerrit Forbes circuits.

Friday, windy.

Saturday, Mr. Tranchomme rolling; Mr. Smiles straights; Mr. Crooke circuits; Messrs. Gould and Forbes circuits and eights. Mr. Gould then flew for his certificate, which he obtained in good style, reaching 1,200 ft. in altitude test.

Sunday, windy.

Ruffy-Baumann School.—Monday last week, on 45 Caudron, doing straights, Blandy (20 mins), Sykes (16), Jackson (8), Kenworthy (16), Cole (12), Roobaert (12), Bell (12).

Wednesday, on 45 Caudron, Bell (20 mins.), Sykes (12), Kenworthy (4).

Thursday, on 45, doing straights: Jackson (36 mins.), Sykes (20), Blandy (20), Cole (20), England (12), Roobaert (12), Bell (12), Kenworthy doing circuits and figures of eights, flying steadily at 1,000 ft. On 60 Caudron, with E. Baumann, Sub-Lieut. Bell (10 mins.), England (8), Lieut. A. W. Clemton (17) (extra practice), Virgilio (10).

On Friday, Sub-Lieut. Bell on 45 Caudron (20 mins.)

Saturday, M. Kenworthy did half of his tests for his certificate.

Instructors, E. Baumann and James Brothers.

Northern Aircraft Co., Ltd.

The Seaplane School, Windermere.—Flying on Wednesday, Thursday, Friday and Saturday last week.

Instructors: Messrs. W. Rowland Ding, C. L. Pashley, and J. Lankester Parker.

With instructors: Flight-Lieut. L. L. Atherton (42 mins.), C. A. Barber (16), D. S. C. Macaskie (32), F. H. M. Macintyre (39), G. S. Railton (56), H. Robinson (54), J. F. Ridgway (43), H. Slingsby (53), H. P. Reid (42).

Figures of eight alone: A. Buck (74), S. J. Sibley (57).

Machines in use: N.A.C. pusher biplane and dual-control Avro.

C. L. Pashley and J. Lankester Parker out testing on different occasions going up high.

FLIGHT

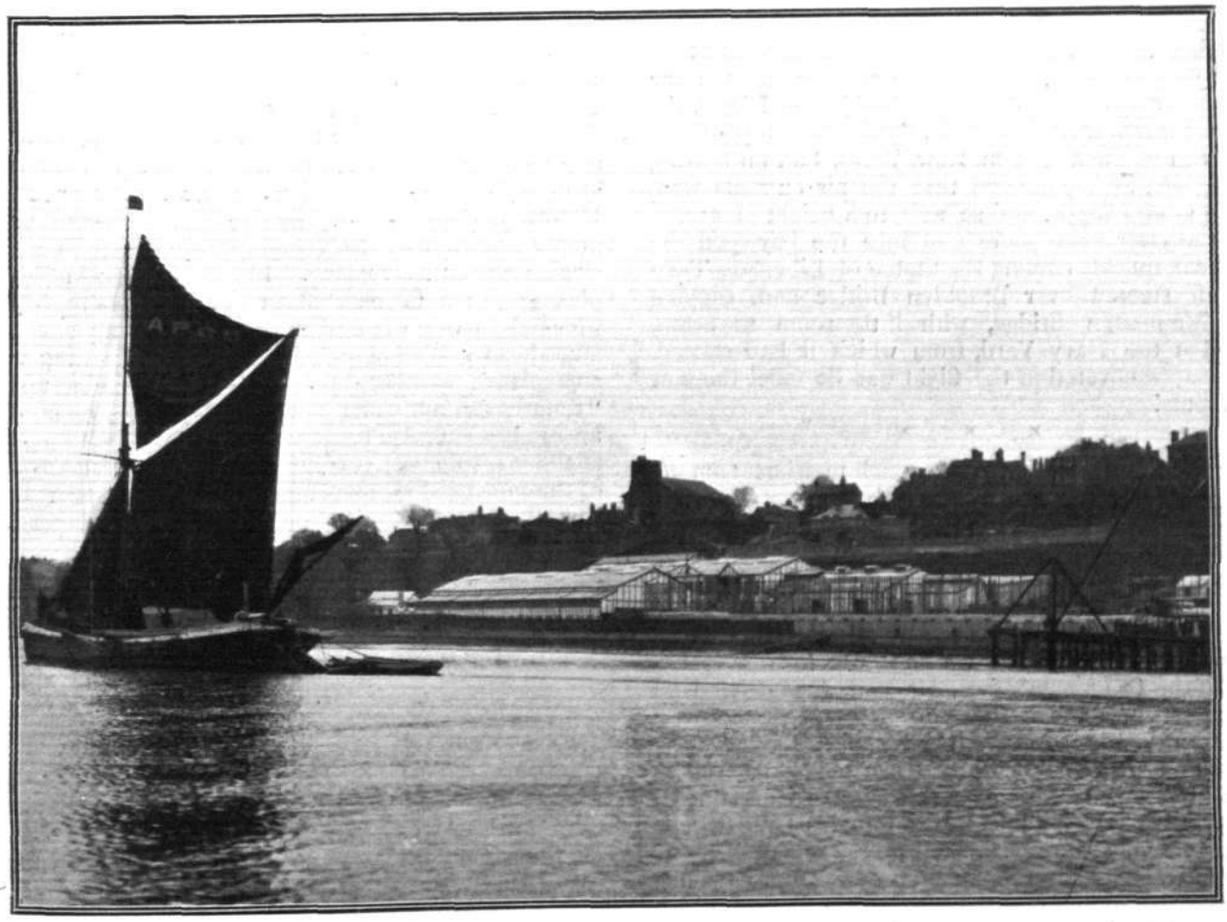
FLYING AT HENDON.

On Thursday afternoon of last week the aerodrome received its first visit from a regiment of soldiers on route march, when about 600 of the Bedfordshire Regiment made the aerodrome a halting-place. They, as well as a good attendance of other visitors, were able to witness a varied display of flying. Marcus D. Manton was out on the 100 h.p. G.-W. military tractor biplane, and M. Osipenko made exhibition and passenger flights on the 50 h.p. G.W. school 'bus. Other pilots and machines in the air were J. L. Hall on his 45 h.p. (Anzani) Caudron biplane, E. Baumann on the 60 h.p. (Gnome) Ruffy-Baumann Caudron, Roche-Kelly with banks on the 50 h.p. (Gnome) Beatty biplane, and W. T. Warren on the new 45 h.p. L. and P. 'bus.

A somewhat puffy wind rather hampered the flying on Saturday afternoon last, but otherwise fine weather made for a pleasant afternoon's proceedings. The first to get going was Roche-Kelly on the 50 h.p. Beatty biplane. Owing to the wind he was not able to execute such thrilling banked turns as usual, but his stunts were nevertheless thoroughly appreciated by the spectators. At the same time that Roche-Kelly was up, F. W. Merriam ascended with a passenger on a 70 h.p. Maurice Farman, whilst a Morane-Saulnier monoplane was brought out and its engine, an 80 h.p. Monosoupape, tested. This machine had been converted from a seaplane to a land 'bus, and had been generally "spring cleaned" so that it presented a very smart appearance. After the engine had been tested, Marcus D. Manton started off for an hour's test. This was only his second flight on this type of machine, but one would not have thought so by the way he handled it. He made an excellent get-off, and mastered the "bumps" by the railway in fine style. Circuit after circuit of the aerodrome he totted up at an average height of about 1,500 or 2,000 ft., and finally at the end of the hour he wound up with a splendid landing, the *bête noire* in flying this type of machine. His performance proved to be all the more creditable, for we learnt afterwards that he had not been flying long when the engine started missing, and he had to "wangle the gadgets" from time to time to keep it going. In the meanwhile M. Osipenko was making flights, with and without passengers, on the 50 h.p. G.-W. school 'bus, and Merriam and Birchenough were out on Maurice Farmans. A Sopwith tractor was also up, and Roche-Kelly made further flights.

On Sunday—rain!

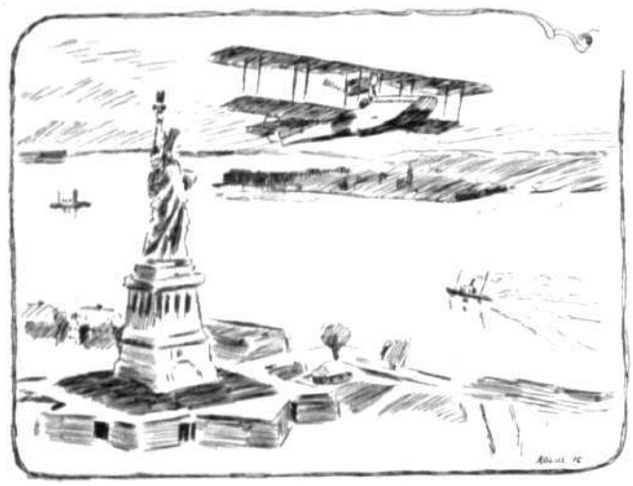
Given fine weather, there should be some interesting flying to-morrow (Saturday) afternoon and Sunday, including bomb-dropping displays by several of the pilot instructors. To give a touch of realism to the proceedings, it is announced that the dummy bombs which will be used emit white smoke on impact. There will also be, as usual, facilities for passenger flights either over the aerodrome or the adjoining country, and it is noteworthy that passenger flights at the present time are very popular, especially among the naval and military visitors, many of whom are candidates for the flying services.



THE GROWING AIRCRAFT INDUSTRY.—A general view of the works of Messrs. Short Brothers' Medway factory, together with the extensions which are now in progress.

EDDIES.

IT seems that the Sperry gyroscopic stabilizer is going strong on the "other side." Partly by way of giving another demonstration of its capabilities and partly because he wanted to qualify for his "expert" certificate, the inventor, Mr. Lawrence B. Sperry, with Mr. Alan R. Hawley, President of the Aero Club of America, as passenger, took his Curtiss flying boat, which is fitted with the stabilizer, for a spin round Manhattan and the Statue of Liberty. They left the New York Navy Yard at Brooklyn, and soon rose from the water after passing



Williamsburg Bridge. Following the course of the East River, the Harlem Ship Canal, and then the Hudson River, they flew over the Hudson to Ossining, where they circled several times, and then turned back. On the way down from the upper end of Manhattan Island, the craft had been flying about level with the top of the houses (no mean height in New York), but, on nearing the City, Mr. Sperry noticed that the air currents were growing more choppy, and so rose to a height of 500 ft. Down the river once more and into the bay sped the flying boat, quickly circling the Statue of Liberty. Then the craft steered over Brooklyn Bridge and, dipping under Manhattan Bridge, with little room to spare, alighted at the Navy Yard, from which it had started. The distance covered in the flight was 80 miles there or thereabouts.

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The following story is causing much merriment among our aeronauticians. Some little time ago a well-known aeroplane constructor, who is far less exacting in regard to his personal apparel than he is where the workmanship and finish of his machines are concerned, was going away from one of our aerodromes in his lorry, when he saw a young Lieutenant sprinting to catch a train, which, however, he just managed to miss. From the look of disappointment on the Lieutenant's face, Mr. —— (not deleted by Censor) concluded that the follower of Mars was in a bit of a hurry, and offered him a lift in his lorry up to town, an offer which was readily accepted. Arrived at their destination, Mr. Hyphen was surprised and highly amused at having a shilling thrust into his hand wherewith to buy himself a—well, shall we say an Apollinaris? In the momentary confusion caused by the unusual situation, Mr. Hyphen refused the *pourboire*, a fact for which he was afterwards sorry, as it would have made an interesting addition to his collection of curios.

Recent nocturnal incident at a station on Tendring Hundred Line in connection with the German air visit to the East Coast:

BILL (anxiously looking skywards): "Harry! She's coming straight for us!"

HARRY: "Shut the road gates, Bill!"

And yet there are folk who assert that the "Man in the Street" is not even now educated up to the appreciation of aircraft.

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Although great success has attended the Beatty school at Hendon when the entourage was composed of Wright biplanes only, Beatty is far too enterprising to rest satisfied with one type of machine, however satisfactory, and in order that his pupils may have an opportunity of gaining experience and practice before "graduating," he has bought three Caudron biplanes, one with a 45 h.p. Anzani engine and the other two with 35 h.p. motors of the same make. This latest acquisition, in addition to four other biplanes coming through the works, and including the new Beatty tractor, will increase the number of school machines to such an extent that it will become necessary to obtain more hangars. With such a variety of types at their disposal, pupils should be able to acquire a fund of knowledge which should stand them in good stead when, after the termination of their school days, they join up with the various military and naval flying centres to complete their training.

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Perhaps few of the captures made by the German army have been hailed with greater satisfaction in German aeronautical circles than was the occupation of the Rheims aviation centre in the early part of the war. Their aviation journals have certainly not failed to make the most of the coup by telling credulous readers of the rich booty in the way of engines and modern aeroplanes, of both the mono- and biplane type, which was raked in. Unfortunately—for the German journals—the photographs illustrating these voluble accounts fail to show a single up-to-date aeroplane. In one of the accompanying photographs a German officer is seen standing on the wings of a partly wrecked Deperdussin monoplane, in an attitude suggestive of a gladiator of old, appealing to an appreciative audience for the sign "thumbs up" or "thumbs down." The pose, however, loses much of its apparently intended effect when one looks a little closer at the machine, which will be readily recognised as being of the type used in this country at the time of the first Circuit of Britain. Although these monoplanes were

Some of the hangars at Rheims damaged by shell fire.

Photograph showing a portion of a wrecked hangar at Rheims and the remains of an old Dep. monoplane.

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Double Fatality at Calshot.

IT is with great regret that we have to record the fatal accident which occurred in Southampton Water, off Calshot, on Monday morning, and by which Flight Sub-Lieut. Stephen Medlicott, R.N.A.S., and Air-Mechanic Henry Hughes lost their lives. At the subsequent inquest Flight Sub-Lieut. Maurice Wright said that when about six hundred feet up the machine turned slightly, banked, and then began to side-slip, a movement which became more pronounced, and finally developed into a nose-dive. The engine appeared to be throttled down, which suggested that the pilot had intended to alight, and the witness thought it possible that the slow speed of the machine prevented the pilot from regaining balance.

A verdict of "Accidental Death" was returned.

Fatal Accident at Hoo.

ONE of the air-mechanics—William J. Standford—attached to the airship station at Kingsnorth, Hoo, near Rochester, was killed on the 23rd inst. while assisting in mooring one of the naval airships. From the evidence at the inquest it appears that while being hauled down by a landing party, the airship was carried away by the wind, which was blowing at 30 miles an hour. All the men let go except Standford, who apparently thought the party would regain control. He was carried to a height of about 500 feet, and after hanging on for nearly ten minutes dropped to the ground and was instantly killed. Flight Lieut. James William Ogilvy Dalgleish, R.N., the commander of the airship, said that the man was about 50 feet from the ground when he first saw that he was on the rope. He immediately let out gas to get down, but the airship continued to rise until the rope was off the ground. The airship was rolling, which made it more difficult for Standford to keep on. She started to come down, and the witness hoped to land in time, but Standford dropped off. A verdict of "Accidental Death" was returned.

excellent machines in their day, the capture of a few of them by the Germans need not be greatly lamented, since they could not have been of much service for war purposes. One cannot help thinking how much this officer's pose would have gained in dignity, had his booted feet been resting on the wings of a modern Dep. monocoque, or even one of the type similar to the monoplane on which Commander Porte did such excellent flying at Hendon in the pre-war days.

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Looking through a recent copy of *Flugsport* the other day, my attention was drawn to an illustration of a "pusher" biplane which seemed strangely familiar. On reading through the matter accompanying the photograph, I learned that it was a Vickers gun-carrying biplane. Attention is drawn to the flags on the interplane struts, which, it is explained, with typical German cunning, denote that the machine only makes practice flights. No, dear Herr Editor of *Flugsport*, if you wish to know the real meaning of those little flags—although you need not communicate this knowledge to your readers—they were put on the machine at Brooklands on "Red Cross" day last year, when the photograph was taken. It is perhaps excusable for a German journalist to be unable to recognise the Red Cross flag. Some of his military compatriots have shown pronounced defects in this respect.

"ÆOLUS."

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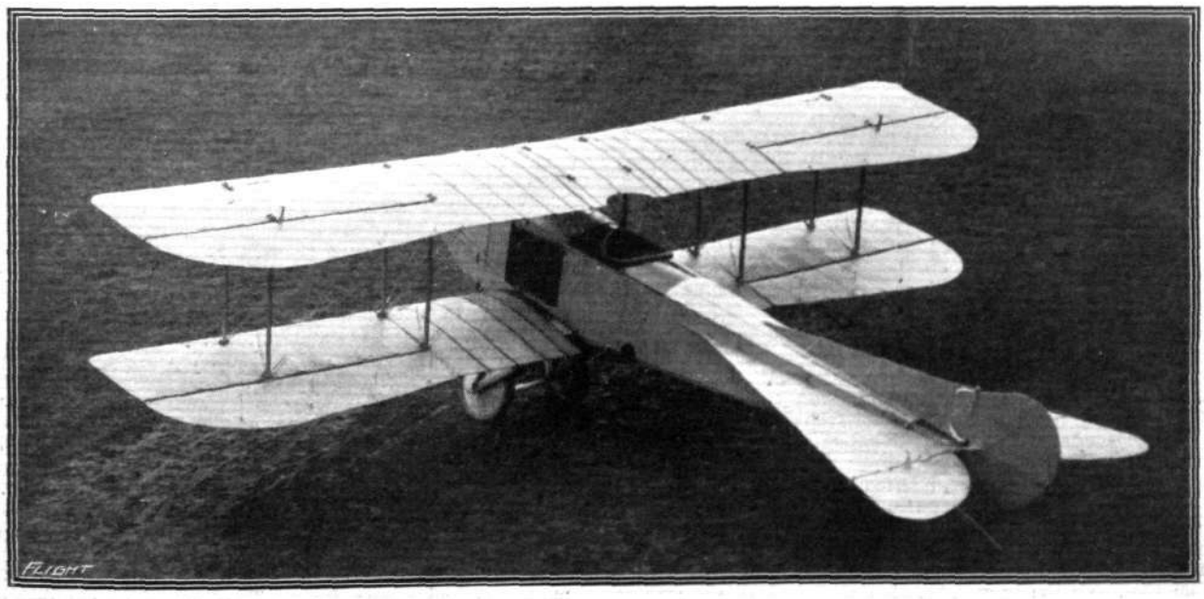
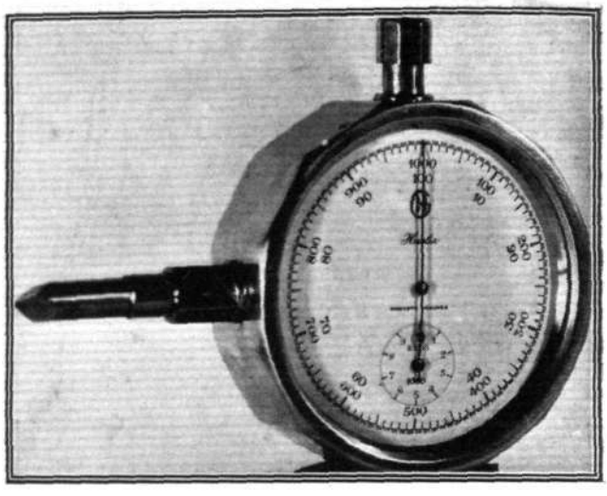


The "Reo" biplane, which has just been completed, and is now ready to be tested at Hendon. The trial flights are expected to take place during the next few days.

THE HASLER REVOLUTION, CIRCUMFERENCE AND CUTTING SPEEDS INDICATOR.

THOSE whose duty it is to test the speed of engines occasionally will be interested in the instrument, seen in the photograph, which is being introduced by the Hasler Telegraph Works, of 26, Victoria Street, Westminster, S.W. By the old method it was necessary to hold the watch in one hand and the revolution counter in the other, and if the latter was not applied for a full minute there was a certain amount of calculating to be done. With the Hasler instrument, however, it is all done automatically in one operation, and the time taken is only five seconds. The actual period over which the speed is taken can be absolutely determined, as the instrument does not operate until the knob at the top is pressed, when clockwork, in the interior of the mechanism, engages the indicating mechanism, so starting the instrument, and releasing it after three seconds. During this period the indicating mechanism is in direct communication with the driving shaft of the instrument, so that an exact record of the speed is provided in a shorter unit of time than would be possible with tachometers based on the centrifugal or magnetic principle. To use the instrument the pointers are set to zero by means of the button at the back, the friction point placed in the countersunk hole in the moving shaft and, when the speed is required to be taken, the knob at the top of the dial pressed, the speed then being recorded on the dial as soon as the clockwork stops. The large dial indicates up to 1,000 r.p.m., while the smaller dial enables speeds up to 10,000 r.p.m. to be taken. In addition to the friction point which forms an integral part of the instrument, two removable "points" are provided for use where a countersunk hole is not available, for instance. There is also a friction disc by the aid of which it is possible to ascertain quickly and accurately circumference and cutting speeds of any rotating disc. Other important features of the instrument are:—

It is anti-magnetic; it has an uniform dial graduation, on which any number of revolutions up to 10,000 can be read with equal accuracy; the driving shaft can be rotated in either direction; the accuracy of the instrument is independent of the variable stresses of the springs or friction of the bearings; it is not affected by vibration or change in temperature; it can be pressed on the moving body



firmly without affecting the time element; the pointers remain on the figures arrived at until re-set.

It is well made and beautifully finished, and is priced at £6 in a velvet-lined case.

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MODERN WARFARE—A DISCUSSION.

WHAT IS THE MOST EFFECTIVE FACTOR?

THERE was a time, and not so very long ago, when the attitude of the general public towards matters aeronautical was tending to be one of a shoulder-shrugging character, due chiefly to a narrow and limited knowledge of the subject. The air work which is being put in daily by aircraft in the great war is, however, rapidly opening the eyes of the public to the usefulness—nay, even vital necessity, of the fifth arm. That the former apathetic attitude is now fortunately changing into one of keen and intelligent interest was very evident from a debate which took place on Wednesday of last week, at a meeting of the Union Society of London in the Inner Temple Lecture Rooms, King's Bench Walk. The subject of the motion was "That Aeroplanes and Seaplanes have shown themselves to be the most useful factor in modern warfare, and 'gasbags' the most useless." Both the opener of the debate, Mr. R. A. Glen, and the opposer, Mr. Edison Thomas, revealed a knowledge of military aeronautics that is most encouraging to meet with, outside aeronautical circles.

Mr. Glen commenced his opening speech with a few preliminary remarks about the history of aviation, including a brief review of the formation of the Royal Flying Corps, and pointed out how the love for sport in all its various branches appeared to have developed qualities in the British pilot which rendered him superior to those of other nationalities. Coming to the usefulness of aircraft, the opener divided into seven main headings the various ways in which aeroplanes had proved their utility: (1) For scouting, (2) as implements for driving away enemy scouts, (3) for range finding, working with artillery, (4) for conveying messages, (5) as destroyers of objects of military value, (6) for the location and destruction of submarines and mines, and (7) as convoys to transport columns.

Under the fourth heading, Mr. Glen called attention to four different ways in which aeroplanes were proving useful in conveying messages: (a) Sending artillery results by wireless (b) as bearers of long despatches, where the aeroplane had been found to be quicker than the field telegraph, (c) for maintaining communication between troops, and (d) for dropping leaflets to inhabitants of besieged towns.

Of the instruments employed by aeroplanes for carrying out the particular branch of their service, referred to under the 5th heading, the opener mentioned machine guns, explosive bombs of various weights, incendiary bombs and flechettes. Mr. Glen pointed out that, compared with the utility of the aeroplane, the advantages of lighter-than-air craft are few, while their attendant disadvantages are numerous. Of the former, mention was made of the greater carrying power of a Zeppelin, its hovering power, the steadiness of its platform (for shooting and bomb-dropping), its capability of travelling by night, and the silence of its engines, whilst the disadvantages of lighter-than-air craft were enumerated under seven headings: (1) Vulnerability from above, and defencelessness against anything above them, since it has been found unsafe to mount guns on top of a Zeppelin owing to the leakage of gas; (2) they are weather-shy; (3) their speed is less than that of the aeroplane; (4) they have less manœuvring power. (In this connection the opener pointed out, that it is interesting to compare aircraft relatively with the ships of Drake's fleet when he secured his victory over the Spanish Armada. It was due mainly to the mobility of the smaller ships, which were able to out-manœuvre the larger, but more sluggish, ones of the Armada.) (5) Cost of construction; (6) need for huge quantities of gas; and (7) limit of altitude.

In opposing the motion, Mr. Edison Thomas complained that the opener had partly anticipated him by handling a number of the points in favour of lighter-than-air craft, or, as the opener was pleased to call them, "gasbags." He thought, however, that there were several points on which the opener had laid himself open to criticism. For instance, the high speed at which an aeroplane travelled must be considered a disadvantage for scouting purposes, since it did not allow of a sufficiently thorough examination of the country over which it was flying. As an instance, the opposer mentioned how one year during the German manœuvres the aeroplane scout sent out was totally deceived by dummy guns placed in spoof trenches, and manned by dummies, so that the scout brought back the report that great numbers of troops were massed at a certain position, when, as a matter of fact, they were miles away. Another point brought forward by the opener was contested by the opposer, viz., that the aeroplane had proved quicker than the field-telegraph for sending long despatches. He had no doubt that the opener had good authority for this statement, but, on the face of it, he would have thought that wireless or a field telephone with underground wires would have been the quicker.

As regards the employment of aeroplanes for dropping pamphlets to the inhabitants of besieged towns, Mr. Thomas failed to see any great utility in this particular respect, since, he said, the leaflets could not be scattered broadcast with any certainty of their dropping where desired, but would have to be dropped in a bundle. One would then have to hope and pray that this bundle would be found by some friendly person who would be willing to act as a sort of glorified newsvendor in distributing the pamphlets.

With regard to the employment of seaplanes, for locating submarines and mines, Mr. Edison Thomas pointed out that this, as far as he was aware, could only be successfully done in clear weather and with a calm sea. As regards the destructive properties of aeroplanes, the opposer was inclined to think that these were less than

FLIGHT

the opener gave them credit for, on account of the comparatively small bombs they were able to carry, whilst the Zeppelin could, he pointed out, carry about a ton and a half of explosives, and had the further advantage that if brought down when over a town they would in their very fall do an enormous amount of damage. Altogether, the opposer could not agree that aeroplanes and seaplanes had proved themselves to be the most useful factor, and airships the most useless.

After the opposer had finished his remarks, several of the visitors spoke, mainly against the opener's contention that aeroplanes and seaplanes had proved themselves the most useful factor in the war, one of the visitors maintaining that battleships must be considered the most important factor, whilst another expressed the opinion that the internal combustion engine had done more than any other single factor to be given this place of honour. Another visitor pointed out that it was hardly fair on the part of the opener to claim that the British pilots were the best in the world, since, during the months preceding the war, a number of world's records had been established by German pilots. In replying to the opposer and visitors who had expressed their disagreement with his views, the opener pointed out that he was willing to admit that the aeroplane could be beaten by other factors for special purposes, but that what he mostly wished to emphasise was the great variety of purposes for which the aeroplane could be used.

THE SCREW PROPELLER.

By F. W. LANCHESTER, M.Inst.C.E.

(*Continued from page* 288).

Now, when we are concerned with the problem of superposed aerofoils or planes, the conditions (as pointed out in the author's "Aerodynamics," § 210) are not the same as where the blades of a propeller are in question. In the former case it is the quantity termed by the author the "sweep" of the foil which is important, and the practical separation distance of two aerofoils is in fact the nearest approach to a positive measure of this quantity; in the latter case it is the peripteral area which is decisive. The point of view of the author, as harmonising the otherwise rather ambiguous position is, in brief, that if experiments were conducted with numbers of superposed foils the individual spacing would require to be increased as the numbers become greater until in the limit the spacing would require to be that corresponding to the peripteral area, that is to say, in the ordinary way the spacing, when the number becomes sufficient, would approximate to from $\frac{3}{4}$ to $\frac{4}{5}$ of the span. It is difficult to say that interference would cease even at this distance, but it can be definitely stated that it must become sensible and even serious if the distance is appreciably less; *the propeller blade conditions are analogous to those of an aerofoil system of superposed members when the number becomes indefinitely great.*

The basis, therefore, on which we shall compute the number of blades permissible will be as follows. An expression will be found for the volume swept per second by the peripteral area of a single blade; complementary to this an expression will be given for the volume passing per second through the propeller or rotor disc area; the latter in terms of the former will give the appropriate number of blades. Owing to the fact that the above is not of necessity a whole number, and that fractional blades are inadmissible, the designer will usually have the option of adopting a number of blades which will result in interference in some degree, or of adopting one less blade, in which case the whole of the supporting reaction as computed from the propeller disc area will not be realised. In the former case the *mechanical efficiency* will suffer to some (usually small) degree; in the latter case a rather larger propeller or rotor diameter will have to be adopted than otherwise necessary.

Let "span," *i.e.*, effective blade length, $= \frac{8}{9}$ diameter of rotor, take periptery as defined by a circle whose *diameter = span*, thus,

peripteral area, $= \frac{9}{64}a = 0{\cdot}14\ a.$

Now we will call the path of the centre of the blade the *peripteral axis*—it is a spiral—and the velocity along the peripteral axis is clearly the v_1 of Fig. 4, hence the volume included by the periptery per second $= 0{\cdot}14\ aV_1$.

Now the effective area of the rotor or propeller disc is its total area less that central portion not swept by the blades; that is to say, a circle $\frac{1}{4}$ of the diameter of the disc requires to be deducted to correspond with the assumption that the effective blade length is $\frac{8}{9}$ of the diameter; in any case this central portion cannot in theory be utilised so long as the instrument is a screw of any kind. Thus,

effective area of disc $= \frac{15}{16}a$ or $= 0{\cdot}937\ a.$

And the velocity u of the air through the disc depends upon the value of Q; in the limiting values,

$$Q = \text{unity}\quad u = v_2/2$$
$$Q = 2\quad u = v_2.$$

In the first case, denoting the number of blades by the symbol N,

we have $$0{\cdot}14\ aV_1N = 0{\cdot}937\ a\frac{v_2}{2} = 0{\cdot}937\ a\ \frac{V_1 \sin\eta}{2} \qquad (12)$$

or, $$N = 3{\cdot}33 \sin\eta$$

In the second case the number is twice as great, or, $N = 6{\cdot}66 \sin\eta$.

We will assume—as it is certainly fair to do—that on the peripteral axis the angle η is given a value in or about that of highest efficiency. If, in any case, this assumption does not represent the fact, it is open for the designer to give the angle in question whatever value he please, and to revise the present calculation to suit his own particular case.

Thus, in the first case, referring to Figs. 5 and 6, $n = 2{\cdot}5$, $\eta = 25$ degrees, $\sin\eta = 0{\cdot}422$ $N = 1{\cdot}4$.

$n = 5{\cdot}0$, $\eta = 21\frac{1}{2}$ degrees, $\sin = 0{\cdot}366$ $N = 1{\cdot}2$.

In the second case, $n = 2{\cdot}5$, η 21 degrees, $\sin\eta = 0{\cdot}358$ $N = 2{\cdot}36$

$n = 5{\cdot}0$, $\eta = 18$ degrees, $\sin\eta = 0{\cdot}309$ $N = 2{\cdot}06$.

From the foregoing we are justified in stating that two blades, in practice the minimum which can be adopted, are more than sufficient; any greater number will have no advantage, and can only result in a lowered efficiency. The particular condition in which the number comes out materially above 2, *i.e.*, with the maximum possible value of Q in combination with a low aspect ratio, is an extreme which can be reasonably ignored: even in this case the provision of three blades would result in considerable interference.

9. Our next consideration will be that of the camber and sectional form of the rotor blade: we have also to consider the question of the variation to be assigned to η at different points along the radius. In connection with the latter point it is to be remarked at the outset that the rotor of a helicopter is not bound down by the ordinary considerations which control the angle variations in the ordinary screw propeller. The whole angle η, in the case of the helicopter, is analogous to a part only of the gliding angle γ, as used in the author's "Aerodynamics," the angle θ representing the effective pitch angle in the screw propeller theory (comp. Part II), is zero in the helicopter, since the latter is presumed to *sustain without axial advance through the air.* In practice, it is true, the machine requires to lift, it must be capable of a certain vertical velocity, but this is not the essential feature of the problem; it is rather incidental. Given that the requirements of sustentation are properly met by the design, it is only necessary to supply the needed additional horse-power and drive the rotor above its normal speed to obtain a definite upward velocity. The detail of the régime under these conditions need not trouble us. In the extreme, if it be considered possible and desirable to obtain a high speed rate of ascent, then the problem ceases to be in fact a special case, and may be treated as an ordinary matter of screw propulsion, and the more general theory of Part III will then apply; at present, however, the *h.p./weight* problem becomes far too severe if a high rate of ascent be contemplated; we must remember that no machine of the type under consideration has yet been even made to lift successfully, let alone to soar like a rocket.

Thus, the angle θ being zero, the angle of the blade in the helicopter may be graded from point to point along the blade length according to the will of the designer, in the same way as the addendum or slip angle in the screw propeller, and in deciding this point the designer requires to take into account, on the one hand, the distribution of the load over the disc area required by theory, and, on the other hand, the falling off in efficiency when the *optimum* angle—as shown by Figs. 5 and 6—is departed from. If the angle be made constant from root to tip, the resulting pressure per unit area on the blade will manifestly include a multiplier varying as the square of the distance from the axis, thus imparting an unduly high velocity to the outer concentric elements of the stream. If, alternatively, the angle η be made variable along the blade length, in such way as to be represented by a true helical surface, then this multiplier becomes proportional to the radius itself, which is that required by theory to give a correct distribution to the momentum in the wake stream, but at the same time results in the employment of angles of somewhat low efficiency. To some extent the conditions may be reconciled by a tapering off of the blades towards their outer extremities, by which means the pressure

per unit area at the different parts of the blade may be kept proportional to v^2 (which corresponds to a constant angle) without throwing too great a proportion of the total load on the outer concentric elements; this is closely analogous to the treatment of the same difficulty in the theory of the screw propeller (comp. "Aerodynamics," Ch. IX). The author believes that in practical design it will be found desirable in both the rotor of the helicopter* and in the screw propeller to accept a compromise, namely, a tapering blade, but not to the degree corresponding to η = constant, in other words a reduction of angle and partial "wash out" of the primary

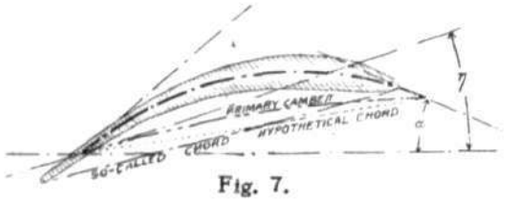


Fig. 7.

camber towards the blade tips, and a slight sacrifice of efficiency consequent upon the extent of angle and camber variation adopted.

The treatment of the question of sectional form in accordance with the author's recently published method ("The Aerofoil") is a matter of comparative simplicity. The primary camber is first assigned (Fig. 7) to give the correct value to the angle η, precisely as if the problem were one of two-dimensional motion, and the secondary or addendum camber is then assigned to accord with an angle α calculated from the expression,

$$\tan \alpha = 0{\cdot}39\ n \tan \eta \qquad (13)$$

as given in § 12 of the paper cited; the camber so obtained (Fig. 7) represents the form of mid-section. The secondary camber should, strictly speaking, be graded to ordinates set off proportional to those of a semicircle whose base is the span, *i.e.*, blade length. Probably there is little real difference if the camber is carried without change to the extremities; in theory this should give a very slightly increased total pressure reaction with a rather-more-than proportionally increased resistance; exact data as to the difference are at present lacking, either as computed in theory or as determined by experiment.

10. Whilst discussing the question of sectional form, it is worth while to add a few remarks of general interest on the point. The actual sectional form of an aerofoil, except in the case of small models of paper or mica, cannot be the lamina represented by the curved line shown in the figure, since, for structural reasons alone, the section requires to possess solidity. Again, it is by no means necessary that the actual foil should have its anterior and posterior margins coincident with those of the theoretical surface; the extent of the foil forward may be curtailed, as shown in the figure by the shaded section, without any loss of sustaining reaction, and the pressure reaction will, near the leading edge, be greater than the mean pressure to make up for the loss of area; indeed this, as an experimental feature, is quite familiar. On the other hand, there is no disadvantage in allowing the posterior margin to extend, conformably, of course, to the lines of flow, some little distance abaft the theoretical limit; by this means it can be ensured that the pressure difference between the upper and lower surfaces dies away before the parted layers of the stream re-unite, and so the production of eddies at the trailing edge is minimised. The reason for the unsymmetrical character of the treatment fore and aft as here given is due to the fact that the practical requirements of stream line form will not tolerate a blunt after edge, whereas a blunt leading edge is not detrimental; in some cases of experimental determinations of the resistance of spar sections it has been reported as advantageous. It is evident that a blunt nose to the section renders it adaptive to considerable variations in the incidence of the lines of flow where the fluid is entered. To some degree the extension of the after edge minimises the detrimental results of disconformity, such as will arise when the attitude of the foil is inappropriate to its loading and camber—otherwise, when its camber is not correctly adapted to its pressure constant, the C of the equation $P = C \rho V^2$. In the wings of birds the adaptability of the after edge is greatly increased by its delicately graded flexibility, and so without doubt variations of flight velocity are provided against; this is a feature which the author believes might well be introduced into the design of the flying machine, especially in cases where the greatest possible variation of velocity is considered important. (*To be continued.*)

* Assuming for the purpose of discussion that the helicopter is to be regarded as a thing of potential utility. It is by no means certain.

AFFILIATED MODEL CLUBS DIARY AND REPORTS.

Club reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Paddington and Districts (77, SWINDERBY ROAD, WEMBLEY).

Monthly Report.—During the past month the wind has been in the wrong quarter for successful flying on the club ground, so there is little to report. On April 17th, R. Bird had out his compressed air tractor monoplane, and obtained several good flights of about 30 secs. duration, but finally a bad nose-dive broke the propeller. H. Woolley was flying a twin pusher with good results. H. R. Weston flying a single propeller tubular *fuselage* canard monoplane, and W. E. Evans his new convertible pusher-tractor tail monoplane. Of the five or six models being tested by the club members for a manufacturer, two were completed and gave entire satisfaction. The prizes for research work in connection with speeds of pushers and tractors have been increased. They are now a silver-gilt medal for 12 flights timed over the measured course, a silver medal for 6, and a bronze one for 3. The date of closing this competition has been extended.

Sheffield Ae.C. (41, CONISTON ROAD, ABBEYDALE, SHEFFIELD).

Monthly Report.—April 1st. At general meeting at Broomhead's, Leopold Street, it was decided that a competition should be held on August Bank Holiday, for the purpose of bringing out further scientific developments in aviation with power-driven machines (other than rubber or spring motors). The competition will be an open one, with an entrance fee for each competitor of 2s. 6d. club members and 5s. for non-members, the first prize being £1, and the second 5s. The second prize will be awarded provided that there are three competitors, but one competitor will be eligible for first prize. Machines and power plants, &c., must be entirely constructed by the entrant, and all machines must be r.o.g. models, they may consist of any type of machine, also any weight and size. The minimum duration to be 15 secs. Each competitor to be entitled to three trials. Further particulars relating to close of entries and time of commencement, &c., will be announced later.

South-Western Aero Club (373, BRIXTON ROAD, S.W.).

MAY 8TH. Competition for r.o.g. tractors, Brockwell Park, at 3.30 p.m., sharp. At the club during the evening, the 1st annual general meeting.

Monthly Report.—The result of the competition for h.l. tractors held in Brockwell Park on April 10th was as follows:—First, Mr. J. W. Reid, 97 marks; average duration, 20 secs., 160 yds.; Second, Mr. Clark, 76 marks; average duration, 13 secs.; Third, Mr. M. Frodger, 49 marks. The dimensions of Mr. Reid's tractor were: Length, 30 ins.; span 30 ins. Mr. Clark's was slightly larger. The former's model flew well and consistently the whole afternoon, but Mr. Clark had bad luck. He hurriedly recovered his plane at the last moment, and made one side more efficient than the other. The result was that the model flew in circles, and the combined effect of propeller torque and rudder work failed to remedy the error. He obtained a duration of 19 secs., however. Mr. Prodger's attempt was decidedly original, and if he had allowed himself more time for testing it, he might have made it fly quite respectably. Models under construction are, tractor monoplanes by Messrs. Howse and Reid, and tractor biplanes by Messrs. Clark and Reid. Mr. R. T. Howse, who formerly belonged to the Bristol and S.W. of England Ae.C., is now a member of this club.

UNAFFILIATED CLUBS

Finsbury Park and District (66, ELFORT ROAD, HIGHBURY, N.).

MAY 1ST. Flying as usual, Finsbury Park, from 3 p.m.

Monthly Report.—During the past two months much good flying has been put in by nearly all members whenever the weather permitted. Messrs. A. Richards, F. E. Rayner, B. H. Barnard, H. Mullin, and W. Hardinge have been working in all weathers with tractor monos., and Mr. A. Savage has been tuning up twin-screw and small tractor. On April 24th, the duration competition resulted in a win for Mr. F. E. Rayner, 41 secs., Morane tractor, with Mr. B. H. Barnard 2nd, 40 secs. Mr. Barnard's machine was built on the lines of the Lincoln Beachey mono., and demonstrated in a high degree its climbing powers and general stability. Mr. A. Richards' machine also deserves special mention, being partially on "Taube" lines and showing great stability. Mr. F. E. Rayner has been out with c/a Morane tractor, but owing to the engine proving rather inefficient, the machine is at present shelved until the engine can be tuned up on the bench to give a better thrust. An addition to the club's Roll of Honour is Mr. S. Gibbs, air mechanic, R.N.A.S. Mr. R. Mullin, who has returned from the front wounded, has been a frequent visitor to the flying ground.

Liverpool Aero Research Club (62, CEDAR GROVE, LIVERPOOL).

Monthly Report.—A fine opportunity to get in a considerable amount of work during April 2nd and 3rd was completely spoilt by bad weather. A capital day on Easter Monday, but an exceedingly poor attendance until late in the day, with the result that the arranged biplane contest had to be postponed again owing to insufficient competitors turning up. E. Kilshaw flew exceedingly well an h.l. twin-screw "canard" mono., but the best times were made by T. W. Bennett, G. H. Kilshaw, and F. Lowe with 1-1-0 p2, though latter is a trifle too fast for duration flying, all three getting some fine altitudes, as did the V. Barrow h.l. 1-1-0-p2. The latter also flew r.o.g. 0-1-1-p2. The best work, however, was the biplane flying earlier in the day by Kilshaw and Bennett, despite an exceedingly tricky wind. On the 10th, the new r.o.g. biplane, dihedral angle wings, of T. W. Bennett made its *début*, showing excellent stability, the rise off being particularly neat, and should, when fitted with propellers that suit her, do some good durations. She is a particularly fine machine. On the same date some fine flying with the G. H. Kilshaw back-curved mono., which has shown good consistency of late, and also out with r.o.g. tractor mono., testing 3-bladed tractor screw, though results nothing great. E. Kilshaw with rather unusual type for club h.l. 1-1-0-p1 some fair heights being attained. On the 17th, T. W. Bennett and G. H. Kilshaw took advantage of a slack meeting to experiment, the former trying a pair of arrow planes, one with greater cord at tips, other *vice-versa*, and testing high and low pitched screw, Kilshaw testing raised and lowered elevators on "canards." During these experiments both members put up some fine performances aided by E. Kilshaw with h.l. mono. The remaining fixtures of the month were rendered void through weather conditions. Although only a moderate month as regards the amount of work got through, the main part has been full of interesting items. The secretary will be glad to receive from members particulars of old machines for inclusion in the club history he is compiling, which, on account of club's youth, will necessarily be short.

Scottish Ae.S. Model Ae.C. (5, DOUNE QUADRANT, GLASGOW).

MAY 15TH. Maxwell Park Pond, waterplane competition.

Monthly Report.—The last month has been very quiet indeed, the only flying done being by G. Pinney with his large covered-in *fuselage* single screw tractor, on the 24th at Maxwell Park, when during a trial flight (25 secs. dur.), the model *vol plané* into the middle of the pond. Dragging operations were successfully carried through. The club history is at present being written up, but as it goes back to 1910 it will not be finished for some time.

FLIGHT

AIRCRAFT AND THE WAR.

Mr. E. Ashmead-Bartlett, writing to the *Daily Mail* under date of April 12th from "Eastern Mediterranean," said :—

"The difficulty of scoring direct hits is enormous, especially when the fire is indirect and has to be corrected by aeroplanes, which are themselves constantly exposed to heavy shrapnel fire, which it is impossible to keep under."

A *Morning Post* correspondent at Athens on April 18th reported :—

"On Friday and yesterday a Turkish aeroplane passed over Tenedos, and dropped a bomb on the harbour, but without doing any damage. French aviators rose in pursuit, and the enemy retired under a brisk fire from the ships."

The *Daily Telegraph* correspondent at Zurich sent the following message on Tuesday afternoon :—

"Two aerial squadrons again attacked the railway positions along the Rhine yesterday afternoon, bombarding successfully Müllheim and Habsheim stations and setting fire to immense forage stores at Mannheim. French aviators appeared over the neutral zone about five o'clock in the afternoon, flying in the direction of Wiesenthal, where they were met immediately by a heavy fire from the heights of Tüllingen, the sky being dotted by puffs of exploding shrapnel. The squadron, which consisted of four fliers, was seen to have headed north, and soon the news came that they had dropped bombs over Habsheim. Having then proceeded further north, they must have reached Mannheim about dusk, as news was then received that the vast depôts, containing fodder for 1,600 head of cattle, at Mannheim were ablaze. They were burnt down completely during the night. The buildings destroyed were the agricultural exhibition halls of the Lanz Machine Works, which had been used for stabling 1,600 cattle removed recently from Alsace, and where great quantities of fodder had also been stored. Nothing is known as to the cattle being saved, and this morning it is reported that nothing was left of the buildings."

According to the *Telegraaf*, during the recent attack by the Allied airmen on the aerodrome at Gontrode, a Zeppelin airship was destroyed.

The following information was sent by an Eecloo correspondent of the *Telegraaf* last week :—

"The Allies' aeroplanes were especially busy over Flanders last Saturday (17th) and Monday (19th). On Saturday they appeared at seven a.m., ten a.m., and noon. At Bruges six bombs were thrown on the military depôt, near the harbour, and near the station. Bombs were also thrown beween Zeebrugge and Lisseweghe, where the Germans keep some aeroplanes.

"It is clear that the Allies must have known all about the movements of the Germans. Troops leaving Bruges for the frontier went later than originally intended. On Monday aeroplanes were busily scouting over Flanders again."

In the "Wireless" news sent out from Berlin on the 20th, there was the following :—

"During a reconnoitring flight made by a Turkish aviator over Tenedos, some bombs were dropped on enemy ships. The aviator returned unhurt, although he was met by a heavy fire."

The *Morning Post* correspondent at Petrograd, writing on April 21st, said :—

"Yesterday a number of German aeroplanes made a concerted raid on Bielostok, where about a hundred bombs were dropped. The number of peaceful inhabitants killed or wounded has not yet been ascertained, but no damage of any consequence was done. On the previous night a German Zeppelin bombarded Tsekhanov, but its bombs effected no injuries. The Russians also took advantage of the now favourable weather for air work and sent several of their "Dreadnought" aeroplanes, which are capable of carrying a score of passengers, to bombard the railway station at Soldau. No details of this raid have been given us officially beyond the statement that the attack was successful."

In the "Wireless" news sent out from Berlin on April 21st, it was stated :—

"German aviators have destroyed a shed in Belfort containing English aeroplanes and six powder magazines.

"The Czernowitz newspapers announce that the Archduke Charles Francis Joseph arrived there yesterday, and was enthusiastically greeted by the population. The Archduke watched for a long time the fighting on the eastern front from a captive balloon, and afterwards returned to the western front."

Mr. James Dunn, in a message to the *Daily Mail* from Rotterdam on the 21st inst., said :—

"On Monday afternoon bombs were dropped by Allied airmen over Bruges arsenal, and on the new aerodrome at Lisseweghe, near Zeebrugge."

In the *communique* sent out from Berlin on the 21st it was stated :—

"Yesterday morning a hostile airman dropped bombs on Lörrach. A silk factory belonging to a Swiss was damaged, as were two houses, several civilians being injured.

"In the Eastern theatre of war the situation remains unchanged. As a measure of reprisal for the Russian air attack on Insterburg and Gumbinnen, which are open towns outside the war zone, we yesterday threw 150 bombs on the railway junction at Bielostok."

The *Times* correspondent in Northern France, writing on April 22nd, said :—

"In no engagement since the war began have the airmen of the Allied forces, English and French, rendered more valuable service to the Army in the field than those they have been able to perform in this fight for Hill 60. It was, indeed, due to the skill and daring of our airmen, and the complete mastery of the air which they won and maintained, that the preparations for the attack were concealed from the eyes of the enemy. Every enemy aeroplane that ventured over our lines was instantly chased away or captured, and in this way five were brought down.

"The famous French airman Lieutenant Garros, was responsible for one. Armed only with a rifle, he did not hesitate to attack a Taube upon which a quick-firing gun was mounted. There was a rapid exchange of shots, but the advantage of speed was with Lieutenant Garros. He was able to outmanœuvre his opponent, and, finally approaching within a few yards of the hostile aeroplane, he shot the pilot dead. The machine had a dual control, and the observer was able to bring it to earth. But he came down in our lines and both machine and observer fell into our hands. This was the last service that Lieutenant Garros was able to render to his country, for, while flying over the enemy's lines on the following day a defect in his machinery obliged him to descend near Courtrai, and, as already announced, he is now a prisoner in German hands.

"This was only one of many fights in the air which have taken place in the past week at Ypres. Occasionally one of our airmen has found himself opposed by three or four of the enemy, but more often it was the enemy airman who was assailed in overwhelming force, for we had a large squadron of aeroplanes at hand. Only once did a German airman, perhaps more daring than the rest, elude our aeroplanes and fly over Ypres. He was quickly chased away, but in his hurried passage over the town he dropped several bombs upon the Place, where shells from the enemy's big guns were bursting. These battles in the air, the manœuvring of the hostile aeroplanes, the flash of their guns, and the little puffs of shrapnel smoke studding the clear blue sky formed a picture of extraordinary interest and fascination."

The *Morning Post* correspondent at Petrograd, writing on April 22nd, said :—

"The increased activity of late by German aviators over a considerable extent of the Russian front has excited another outburst against German brutality. While Russian aviators are employed solely against military structures, or such as have a military value, like bridges and railway stations, as well as war stores and the like, the German aeroplanes have been particularly busy dropping bombs, not upon places where any military purpose could be served, but upon crowded town districts, especially—as was the case recently at Bielostok—in the poorer quarters, where the sufferers were exclusively the most indigent class of Jews. This is not war, and will (says the semi-official communication) possibly lead to reprisals. Two men and their aeroplane were captured at Zambroff. Bomb-dropping has recently taken place at over a dozen populous centres where no warlike purpose could be served.

"Since the Russians took to shooting at sight any aviators captured with incendiary leaflets there has been a great deal less bill-sticking on the part of the German aeroplanes. According to present practice I understand that bombs found in an aeroplane captured are only potentially fatal to the German aviator. He is generally able to save his life by parting with information. But no mercy is shown to those carrying incendiary leaflets."

According to messages from Paris on April 23rd, two German aeroplanes passed over Amiens on the morning of the 22nd and dropped a quantity of pamphlets.

A special correspondent of the *Daily Mail* at Petrograd, writing on the 22nd inst., said :—

"A new Russian aeroplane, of huge size, this week successfully appeared on the front for the first time. This flying machine is the Russian reply to the Zeppelin threats. It carries a crew of fourteen men and drops heavy bombs of violent explosive power. I am not allowed to give details of its construction at present. But the War Office promises me a trip in one of the new epoch-marking machines as soon as possible.

"The supply base on the German line of communications, Soldau, in East Prussia, has been severely damaged by bombardment from these immense biplanes, which are called Ilya Mourometz."

On the 22nd the following message was received in Rome from Pesaro :—

"During the night an Austrian aeroplane flew over the town, causing great excitement."

The Milan correspondent of the *Petit Parisien* sent the following on the 22nd inst. :—

"An Austrian airship last night flew along the coast to the south of Ancona, making use of its searchlights. The officer commanding the port of Ancona has reported the matter to the Government. A telegram from Pesaro declares that fishermen have seen several aeroplanes, believed to be Austrian, coming from the direction of Dalmatia, and flying over the sea front in the neighbourhood of Pesaro."

The following message was sent from Petrograd by Reuter's correspondent on the 23rd inst. The reference to airships is apparently an error, the aircraft apparently being the giant Sikorsky biplanes :—

"An Ilya Mourometz airship flew over Plock yesterday, and threw fifteen bombs of considerable weight, some of which struck German boats on the Vistula. Other bombs burst in a square of the city and among the enemy's transport.

"Two other Russian dirigibles, an Ilya Mourometz from Kieff and a No. 3, bombarded the railway station at Mlawa and the German aerodrome at Sanniky. Each dirigible threw bombs, the total weight of which exceeded fifteen puds (5 cwt.). Three bombs struck station buildings, two others fell on aeroplane hangars, and two more hit aeroplanes which were not under shelter. Several fell in the enemy's trenches. The Russian air Dreadnoughts flew at a considerable height, and the enemy's fire did them no damage."

The Salonika correspondent of the *Echo de Paris* telegraphed on Saturday last :—

"According to reports published by Greek papers, British and French aeroplanes have recently made frequent flights over Smyrna and the neighbouring country.

"The damage caused by the bombs which the French aviators recently dropped is stated to be very serious. Two bombs fell on Fort Kastro, at the entrance to the harbour, killing and wounding several soldiers. One projectile struck the railway station and another a German vessel anchored in the port, which was sunk. Observations made by the allied aviators have enabled them to ascertain that the Turkish army at Smyrna numbers approximately 35,000 men, divided more or less equally into two parts, one of which occupies the trenches recently dug between Vourla and Smyrna and the heights which dominate the town, and the other the forts of the 'Two Brothers' and Bastrati, which have been rebuilt."

In a graphic description of the French advanced positions, written by Signor Giuseppe Bevione, and published in the *Daily Mail* of the 24th inst., there was the following :—

"The French possess a complete map of the enemy trenches drawn from aeroplane observations. The uses of aeroplanes in warfare are enormous, incredible. Not only do they direct the artillery fire with perfect accuracy, but they reveal the enemy's positions with the most precise photographs. I have seen some of these photographs, and have been astounded at the minuteness of their smallest particulars.

"It is certain that the Germans have similar information of the French lines, but as it is much more probable that the future big advance will be that of the Franco-British, it will be readily seen that this information gives them a precious superiority, as they know precisely against which points they must press home their attacks with greater strength. The Germans will derive no benefit from their knowledge, as their efforts will be merely concentrated in defence. If the Allies dispose of sufficient reserves of men to push forward, even at a dreadful cost, this general attack to drive the Germans from their first line of defence, not giving them time to consolidate their second line of defence, which it has been ascertained from aeroplane reconnaissances are 50 kilometres inland, the problem will be solved."

A *Times* correspondent at Mytilene, writing on April 24th, said :—

"It is reported that two German aeroplanes which threw bombs over Tenedos were both hit by shrapnel and brought down. The fate of the airmen is not mentioned."

A *Times* correspondent in Paris sent the following message on April 25th :—

"A Taube, taking advantage of the fog, succeeded in reaching the neighbourhood of Compiegne yesterday, and, mistaking the German outposts for French troops, dropped several bombs on them, inflicting much damage."

The Roulers correspondent of the *Telegraaf* on Sunday reported :—

"German field artillery are posted south of Moorslede with six horses for each gun, always ready to move, owing to the frequent aud successful reconnoitring of the allied airmen. There are heavy guns north of Moorslede.

"Between the Yser and Bruges allied air attacks are of daily occurrence, and many soldiers have been killed in the flat country."

A Ghent correspondent of the same paper states :—

"An airman recently appeared above Gontrode, east of Ghent, and was at once heavily bombarded, Apparently, in order to deceive the Germans, the airman employed a *ruse de guerre*. He allowed his machine to fall rapidly upside down. The Germans ceased fire, believing the airman hit, but the latter suddenly righted his machine and dropped two bombs, then disappeared. Some airsheds were damaged by the bombs. Similar visits have repeatedly been made to airsheds at Gits, Lisseweghe, Gesthel, and Gontrode."

The Athens correspondent of the *Journal*, writing on Sunday, said :—

"Two Turkish aeroplanes, flying over Tenedos, were obliged to land, having been half destroyed by the fire of the Anglo-French fleet. Several French aeroplanes attacked with bombs, on the afternoon of the 23rd, an ammunition magazine at Maidos, a Turkish village on the European coast in the Dardanelles, where there are important forts."

In the report sent out from Berlin on the 25th inst. there was the following :—

"As a reply to the air bombardment of Meidenburg we again threw twenty bombs on Bielostok, which is a railway centre."

According to a telegram from Stuttgart received in Amsterdam on Tuesday the following announcement had been made by the Minister of War :—

"In the forenoon a hostile biplane, coming from the west, flew over Oberndorf (Würtemburg), dropping four bombs, all of which landed in the arms factory. The airman was fired at with machine guns.

"Six civilians were killed and seven severely wounded by splinters. The material damage was insignificant, and the working of the factory has not been disturbed. The airman escaped in a westerly direction."

The *Morning Post* correspondent in the North of France, writing on the 27th regarding the fighting round Ypres, said :—

"Prior to the opening of this great fight an ingenious German reconnaissance was thwarted by the alertness of the Canadian gunners. Three British aeroplanes were observed to be hovering on and off the lines. They were being fired at by the Germans, but a Colonial artilleryman remarked that either the German gunners had become woefully bad shots or else they were not really trying to hit them. He reported this, and orders were given to fire on the suspicious aircraft. One was brought down. It was certainly a British model, but mounted by two Germans. Immediately after this incident the enemy attacked.

"Again the aerial activities of the enemy have been renewed. Aeroplanes have visited Amiens, timing their visit to coincide with the great civic funeral that was being given to the victims of the last deadly raid. These threw six bombs, all of which, however, fell in gardens, doing no damage. A Zeppelin visited Calais in the early hours of yesterday morning and threw a number of the new bombs that they are using of greatly increased power. A considerable number of casualties occurred among civilians, estimated, I understand, at thirty. Civilians have all been removed out of Ypres and Poperinghe."

Models

Edited by V. E. JOHNSON, M.A.

Model Aeronautics in Holland.

AT the present time, when quite a number of our countrymen are "interned" in Holland—amongst them, in all probability, some aeromodellists—especial interest attaches to the following communications received from Mr. J. H. W. v. d. Muelen, the hon. sec. of the English Model Aero Club of the Hague.

"I send you," writes our correspondent, "three photos. and a little article that I hope you can use in FLIGHT, of which I am a constant reader. I can always give you all information and news in connection with Dutch model aeronautics. If you want photos., articles, &c., please just let me know."

We shall always be pleased to receive any news of model flyers or their work which may be going on in Holland. An interchange of knowledge of this character can only be to the mutual interest of both parties.

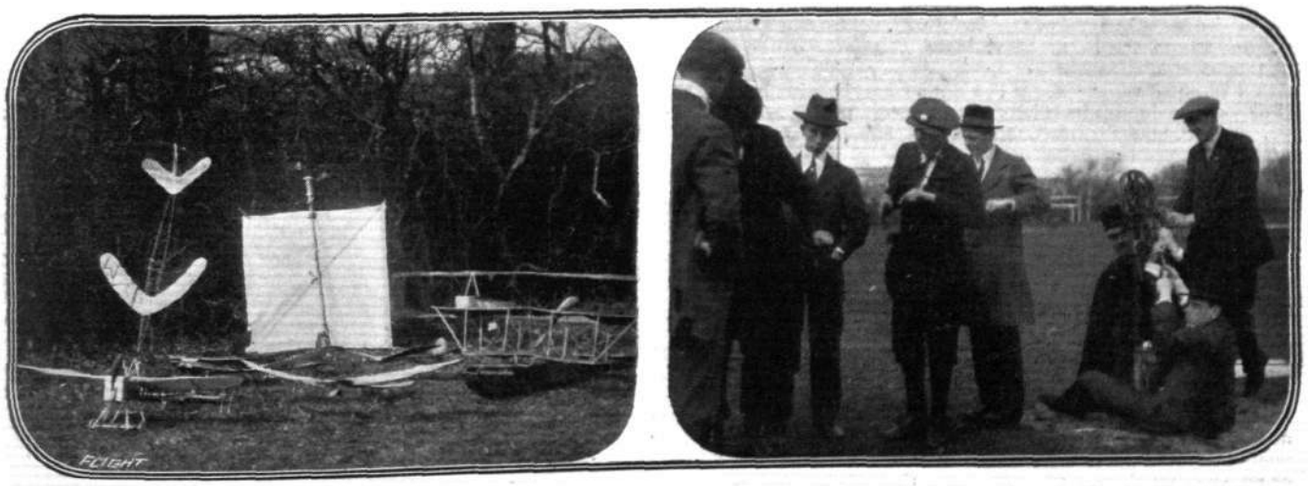
The writer has several times advocated a contest in this country on the lines of the one described below.

An Interesting Gliding Competition of a Dutch Model Aero Club.

On Good Friday last the Haagsche Prvefvlieg Sing Club (H.P.V.C.) (in English, Model Aero Club of the Hague) held an interesting gliding competition on the grounds of the Dutch Kite Society at the Hague. First of all, a kite was raised in the air on a steel wire with the aid of a windlass. On the steel wire was bolted an iron plate; this was the buffer for the apparatus described below. This apparatus is an ingenious machine invented by a Dutch draughtsman. It works as follows:—The flying machine is hung up on a hook at the rear end of the apparatus, the frame of which consists of a steel tube with two pulleys to run on the steel wire. On the hook is also fastened a little rope that is tied to the square plane of the apparatus. Now the wind blows against the plane, and the apparatus carrying the flying machine rolls along the steel wire on its two pulleys higher and higher, till it reaches with a considerable speed the buffer. The hook springs open by the shock, and the flying machine falls down in *vol plané*. But, as mentioned, there is a little rope in the hook. This rope stretches the plane against the wind, but when the hook opens this rope becomes slack. The plane is no longer stretched, it waves about slack in the air, and the apparatus comes down on the two pulleys along the steel wire, ready to bring up another aeroplane. On photo. No. 1 this apparatus is visible in the background. Note the under pulley just above the direction rudder of one of the models. As is also visible, the apparatus is protected at both ends by coil springs to break the heavy shocks. On the same photo. are also visible two of the winning machines; the first the winner at the front of the picture between the hydroplane and the machine, something like a Blériot on the left-hand side; the second, the machine standing on its nose near the apparatus, with the word Arrowplane on its tail, which obtained the third prize. All the prizes were medals. The official result, given by the formula $\frac{\text{Time of gliding} \times \text{Weight (Gr.)}}{\text{Surface } (cm^2)}$, was as follows:—

			Time.	Marks.
1.	Gold medal ...	Mr. Th. E. Slot	62 secs.	1,054
2.	Silver medal	Mr. J. Lipjis, jun.	42 ,,	840
3.	Bronze medal...	Mr. J. H. W. v. d. Muelen	47 ,,	799
4.	No prize ...	Mr. J. P. A. Huysers ...	20 ,,	400
5.	No prize ...	Mr. Wesjer	29 ,,	329

THE HAGUE AERO MODEL CLUB.—"And I went up higher and still higher and higher."



THE HAGUE AERO MODEL CLUB.—On the left the launching apparatus and some of the models, including the two winning machines. On the right the breaking of the kite string.

The height from which the machines fell down was 225 ft. Alas, there were some trees in the neighbourhood and some of the machines fell in the top of a tree. Photo. No. 2 gives some idea of the difficulty of bringing down such a machine. One other incident was the breaking of the steel wire at the moment that the kite drew something about 100 lbs. This scene is visible at Photo. No. 3. The gentlemen on A are, from right to left: First, Mr. J. H. W. v. d. Muelen, hon. sec. of the H.P.V.C., holder of the Dutch ground-starter twin-pusher monoplane duration record, 64⅘ secs.; second, Mr. v. Disjel, one of our members; third, Mr. Jhr. T. B. van den Berg van Hiemstedle, hon. sec. of the Koninklyke Nederlandsche Vereeniging voor Luchtvaart, chairman of the H.P.V.C.; fourth, is Mr. van den Broek, an aeromodellist; fifth, is Mr. Wesser, one of your youngest members; and, sixth, is Mr. J. Lipjis, Jun., holder of Dutch hand-starter twin-pusher monoplane duration record, 93⅘ secs.

I hope the photos. and article will interest your readers, and if you like it I will send some more photos. on another occasion.

The photos are taken by Mr. Huysers, treasurer of the H.P.V.C.

Some Remarks on Steam Plants for Model Aeroplanes.

(*Continued from page* 291.)

The idea of using the water reservoir as a feed heater or recuperator, in such a manner as to make use of some of the waste heat for the purpose of assisting in supplying some of the heat necessary to raise the temperature of the water to be turned into steam, and thus effect a saving in the heat necessary to be supplied by the blow flame, is undoubtedly an excellent one.

In steam automobile practice a method employed is, that instead of the water being pumped direct into the generator it is passed through a pipe, around which the exhaust from the engine is directed, and some of the heat contained in the exhaust steam is thereby extracted. In the small type of plant generally used in model aeroplanes it might possibly be a better plan to steam-jacket the cylinders by means of the exhaust steam. Experiment alone can determine which is the better plan, and whether either is really worth carrying out. The great trouble in small plants of the flash-boiler type is not lack of power, but the difficulty of properly regulating it, without using any automatic contrivance which shall greatly add to the weight. The last-named factor is really the determining one, and any use of thermostats, flowmotors, and water regulators must be of an extremely simple and modified character.

If the outlet valve (the one admitting the water into the flash boiler) be opened too far, then the engine becomes flooded, and the propeller thrusts falls rapidly. When using a pressure-fed plant it is of considerable importance that the reservoir should be as large as possible, for if the reservoir be large the pressure will drop but slowly; whilst if a small one be employed, and at the beginning this is, say, half full of fuel at a pressure of 100 lbs. to the square inch, then by the end of the run, when all the water is used, the pressure will only be 50 lbs., since the air will now have expanded to twice its former volume. Whereas if the reservoir were initially only one-eighth full of water at the commencement, the rest being compressed air (more strokes of the pump would, of course, be required for the pressure to be the same), then when all the water has been used the pressure would still be seven-eighths of the original pressure, *i.e.*, it would have dropped only one-eighth.

The problem is in reality a far more complicated one than is apparent at first sight. To obtain the best results, the flame of the lamp and the pressure at which it is working require to be at a certain point—so also does the pressure in the water reservoir and the extent to which the valve is opened. There are here four variants, so connected that any variation in any one of them affects the total or combined result of the whole four. These variants are not all of equal value. Once the lamp flame is initially correctly regulated it maintains its efficiency fairly constant to the end of the run. Not so, however, the water supply, which requires for the best results a proper regulation from beginning to finish. Instead of using a pressure-fed reservoir a pump-fed one can, of course, be employed, and is undoubtedly much to be preferred, the pump being worked from the engine, driven, say, by a pin screwed into a disc on the crankshaft. It is, however, another piece of apparatus to get out of possible order, and absorbs power from the engine, and there is also the extra weight. It is obvious that the pump requires just as careful regulating as the pressure feed. The disc on the crankshaft could be drilled with a series of holes (spiral form), so that the pump stroke could be altered until the best position for forcing water into the flash boiler at some volume and speed for maximum efficiency when combined with a certain lamp flame and feed was obtained. A possible contingency to be guarded against appears to be that as the pace of the engine increased so would the pump feed until the maximum efficiency was passed, water formed or rather water allowed to pass through the coils without being fully converted into steam at the proper pressure and superheat, with a consequent and simultaneous falling off in efficiency and propeller thrust, since the quantity of water pumped into the boiler depends not only on which hole in the disc the pin is screwed, but also on the revolutions per minute made by the crankshaft of the engine itself.

In the pressure feed system, of course, the original pressure is continually falling (unless, as suggested, some special means be adopted to prevent this), and in consequence the working steam pressure in the engine gradually grows less and less (unless the valve be *gradually* opened, in which case the working pressure can be maintained), there being a certain maximum efficiency, given certain pressures in both lamp and reservoir, these same being also combined with a certain opening of the combined regulating and emitting valves in both cases.

With regard to the all-important question of lubrication, splash lubrication has almost invariably been used—a special oil such as is used in air-cooled petrol engines being employed—and for the rotary valve (where such has been used) enameline. Forced lubrication would undoubtedly be better, but this adds another complication to the plant, which must always, in small sizes, be kept as simple as possible; refinements can only be developed in course of time.

Experiment has shown that in the case of a pressure fed plant, if the valve on the water reservoir be opened *very gradually*—using a double lever worked by a very fine thread—the initial propeller thrust can be kept up right to the end. A manner in which a pressure-fed plant could have its efficiency increased is by placing the water reservoir in such a position that the flame from the blow-lamp (which extends to some distance beyond the cylindrical casing) played around the upper half of it, heating and expanding the air, and therefore increasing, *i.e.*, keeping up and augmenting, the gradually falling pressure; matters could also be arranged that it heated the water as well, expanding some of it into steam, and so again increasing the pressure; even if water and not steam were ejected into the boiler it would be hot and not cold.

One such experiment, at any rate, has actually been tried under the above conditions. The great difficulty experienced was, however, that, in this case, the water reservoir heated up too quickly, before it was really wanted. This is, however, merely a matter of proper regulation and further experiment.

Reply to Query.

J. M. J. ROOTS.—(1) The model ornithopter to which you refer could and possibly still can be obtained at Messrs. A. W. Gamage, High Holborn. (2) Very possibly owing to an air current due to the wall.

(*For "Model Clubs" see page* 306.)

Cellon's Telegraphic Address.

OWING to a printer's slip the telegraphic address of Cellon, Ltd., in their announcement in our last week's issue was made to appear as "Ajawd." As our readers well know, of course, the correct address is "Ajawb, Stock, London."

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